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Handbook on Erect Bamboo Species Found in the Philippines

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Ecosystems Research and Development Bureau

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FOREWORD

Bamboos have been part of our daily lives since time immemorial. It is probably the first housing material used in almost all countries where it thrives and it is still the main construction material for semi-permanent dwellings of people living in the countryside. Bamboo can also be found decorating palatial homes as high grade furniture and decorative artifacts.

Many innovative applications have been developed for bamboo such as the use of bamboo fibers in plastic composites (Japan and Germany), wind turbine blades (United Kingdom and China), bamboo sanitary napkins (India) and bamboo bandages (United States). It is also used as a material to make helmets (France) and covers for personal computers (Dell and Asus).

The rhizomatous root system of bamboos helps bind the soil and prevent soil erosion. The evergreen covers of bamboo provide valuable wildlife habitats and contribute towards carbon sequestration.

The potential of bamboos, especially *Phyllostachys nidularia* and *Phyllostachys heteroclada*, in phytoremediation has been reported to replace the traditional water plants like *Phragmites australis*.

Furthermore, many more new uses will emerge as development research on this versatile material progresses.

Botanists often had difficulty assigning scientific names to bamboos. Generally, the flowers are the primary features used to classify plants. However, a few bamboos are reported to flower at intervals that can range from 60-120 years, long enough to outlive the individual botanists attempting their classification. This infrequent flowering has caused bamboo taxonomy to lag far behind that of other plants.

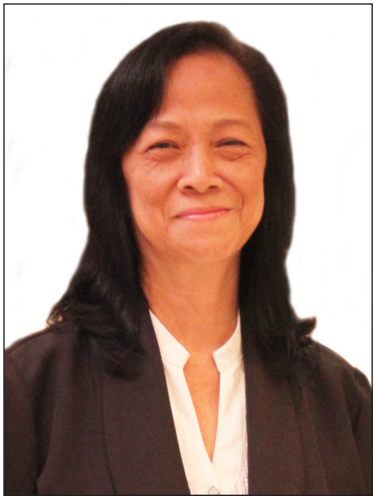
In the past, we had to familiarize ourselves with a few bamboo species. Presently, so many species have been introduced, and it has been difficult to keep track of each of these species to study their potentials and specific usage.

In addition to classifying the names of some of the presently cultivated bamboos, this publication brings to light the introduction of many more beautiful bamboos.

For the readers' interest, the origin/geographical distribution, brief description of the species, uses, propagation methods and photos of each bamboo species are discussed in this handbook.

With this commendable work, I give my congratulations to the author and the group who made the publication of this handbook possible.

MARCIAL C. AMARO JR., *CESO III*
Director



PREFACE

The Handbook on Erect Bamboo Species Found in the Philippines was prepared and published not only for field use but also for bamboo scientists, botany instructors, foresters, bamboo enthusiasts and private individuals engaged in the production and plantation establishment of bamboos. This was done to include a lot of recently introduced species, especially those from China.

We have been doing researches on bamboo since 1987. However, we have encountered difficulty in looking for references/ previous works on bamboo especially in identification, naming and classification of bamboos found in the Philippines.

Previous works on Philippine bamboos are scattered in different journals, books and other publications. The descriptions were usually based on materials in the herbarium, while information on field characters was very insufficient.

This work was based mainly on information/data gathered in the field or where each bamboo species was found planted. Verifications were made using various books, manuals, and other reference materials. Existing or published keys in books were also found to be of great help.

We kept track of present nomenclatural changes for each species and incorporated the revisions made and used the updated names in this publication. The published papers of bamboo experts were also consulted for more information.

Bamboos are very important in the lives of the Filipino people from the propagators to the growers, harvesters, manufacturers and exporters of bamboo products. Thus, we offer this publication to them and to other bamboo users and enthusiasts.

Cristina A. Roxas

CRISTINA A. ROXAS
Author

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The Editors, Mr. Eliseo M. Baltazar and Ms. Malaya N. Montesur;

The immediate family members of the author, ITAY, INAY, Ateng and the rest of the family, especially to Isabel, for helping the author in encoding the data, typing the descriptions of the bamboos, and for their love, inspiration, understanding, patience and moral support; and

To God, Almighty, for everything.

INTRODUCTION

Bamboos belong to the family of grasses, Gramineae or Poaceae. They can be characterized as having woody, usually hollow culms, complex rhizome and branch systems, petiolate leaf blades and prominent sheathing organs. Moreover, all the members possess similar anatomical features in the leaf blades (i.e., fusoid cells and arm cells) which set the bamboos apart from grasses.

There are an estimated 1000 species of bamboo belonging to about 80 genera in the world. Of these, about 200 species are found in Southeast Asia and belong to approximately 20 genera. Bamboo classification is far from complete and most genera are not well understood (PROSEA 1995).

Knowing the correct identity of a plant is basic to the understanding of the plant's characteristics and uses. In forestry, identification is of fundamental importance in vegetation analysis, inventory of existing stands of trees and other plants, management of protected areas, biodiversity assessment, pest and disease management, food chain studies and many more. This is the reason why a course in dendrology or plant taxonomy is always included in the baccalaureate curricular programs of forestry colleges throughout the world.

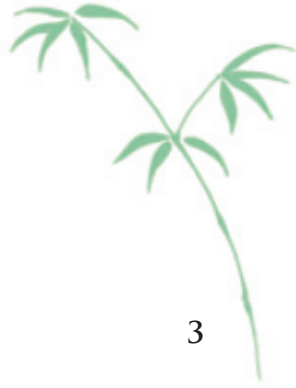
In several other fields, plant identification is likewise given much importance. In the area of herbal medicine, for instance, experts agree that identification is of crucial importance because human lives can be seriously endangered if the wrong species or variety is used. Similar consequences may also occur when incorrectly identified plants are used for food or as livestock feeds.

For ages, bamboos have been used for a lot of purposes. In the Philippines, they are used for construction, furniture and handicraft manufacture, food, musical instruments, farm and fishing implements, pulp and paper, fuel for cooking and heating, etc. In May 2010, Executive Order 879 was issued by the Office of the President of the Republic creating the Philippine Bamboo Industry Development Council (PBIDC) which mandates the use of 20% of bamboo for reforestation, 25% for the desk requirements of all public elementary and high schools in the country, strengthening of the bamboo industry and intensification of research on bamboo production and utilization. The issuance of this EO, demonstrates how much importance the government places on bamboo for socio-economic development, environmental enhancement and power generation.

The development of a vegetative key for the identification of bamboos found in the Philippines would be of great help to the following: 1) bamboo scientists who conduct studies on the propagation, ecological and physiological requirements, culture, properties and utilization of different species of bamboo; 2) instructors of botany subjects; 3) private individuals engaged in the production of planting stocks of different species whether for plantation development or for landscaping purposes; and 4) foresters engaged in the development and management of bambuseta, botanical gardens, theme parks and plantations.

The key for identification is based entirely on vegetative characters for one important reason - most species of bamboo do not produce flowers annually. In fact, flowering occurs at irregular intervals and for some, the interval may be as long as 25 to more than a hundred years. On the other hand, vegetative characters can be determined almost throughout the year.

The handbook contains the identification key, distribution, uses, brief description of each species, propagation methods of each species, glossary of terms and photos of each bamboo species.



Giant bamboo (*Dendrocalamus asper*)

KEY FOR THE IDENTIFICATION OF DIFFERENT BAMBOO GENERA

A. Member species with sympodial, clump-forming type of rhizome

B. All species with thorns .....*Guadua*

B. Some member species with thorns; back of culm sheaths with dark brown hairs or glabrous; culm sheath blades are erect; culm sheath auricles are distinct, rounded with bristles .....*Bambusa*

C. Member species without thorns, very big in height and diameter, young culms are covered with light to dark brown, velvety to rough hairs

D. Culm sheath auricles are thick, young culms of member species are covered with light to dark brown velvety hairs, node is prominent with aerial roots .....*Dendrocalamus*

D. Culm sheath auricles are low, firm, distinct, rim-like or small and inconspicuous

E. Culm sheath auricles are low, firm, rim-like; back of culm sheath has dark hairs; young culms of member species are covered with light to dark brown rough hairs; node is not prominent .....*Gigantochloa*

E. Culm sheath auricles are small or inconspicuous, leaf blade is glabrous, back of culm sheaths has short appressed light hairs .....*Thyrsostachys*

C. Member species are medium to small in size; thin to thick walled culms, green, with or without purplish to brown lines or covered with yellowish stiff hairs; have many branches of unequal sizes; leaves are big and wide to very narrow

F. Member species are medium in size; thin-walled, young culms are green, purplish to brownish, especially on the basal portion; branches many of unequal sizes .....*Nastus*

F. Member species are medium to small in size; thin to thick-walled; young culms are green, covered with whitish waxy

powder or yellowish stiff hairs; branches many of unequal sizes; leaves are big and wide or very narrow

G. Member species are medium in size; thin to thick-walled; young culms are green, covered with whitish waxy powder or yellowish stiff hairs; branches many of unequal sizes; leaves are green, big and wide to long and narrow with striations

H. Member species are medium in size, thin to thick-walled, green, covered with whitish waxy powder or yellowish stiff hairs; branches many of unequal sizes; leaves are green and medium sized

I. Culm sheaths have 1 or 2 transverse corrugations at the top portion, culm sheath blade is erect, culms are loose .....*Melocanna*

I. Culm sheaths do not have corrugations, culm sheath blades are erect or reflexed, culm blades are erect or reflexed, culms are densely tufted .....*Schizostachyum*

H. Member species are medium in size, thick-walled, culm sheath and leaves have striations .....*Sasa*

G. Member species are generally small, culms are green, with or without striations; culm sheath with or without striations; leaves are small or big with or without striations; leaf sheath is light green to pinkish with light brown bristles

J. Culms are green; leaves are small to very narrow, green or with striations; leaf sheaths are light green to pinkish

K. Culms are green; leaves are green, linear or with striations; leaf sheath is light green with light brown bristles .....*Arundinaria*

K. Culms are green, leaves are green and very narrow, leaf sheath is pinkish .....*Otatea*

J. Culms have white striations, culm sheath has striations, leaves are big with prominent striations ...*Hibanobambusa*

A. Member species with monopodial, non-clump-forming or running type of rhizome

L. Internodes flattened or grooved at one side, in line with the branch complement; branches two of unequal sizes .....*Phyllostachys*

L. Internodes not flattened, branches more than one, some thicker than the culms

M. Branches 4-8, culm sheath persistent and longer than the internodes; leaves linear lanceolate .....*Pseudosasa*

M. Branches typically three; culm sheath deciduous, not longer than the internodes; leaves broadly lanceolate to lanceolate

N. Leaves 3-4, green, broadly lanceolate to lanceolate, pubescent beneath to glabrous on both sides

O. Leaves 3-4, green, broadly lanceolate, face different from part to part, pubescent beneath .....*Shibataea*

O. Leaves 3-6, green, lanceolate, glabrous on both sides, sometimes have white striations .....*Chimonobambusa*

N. Leaves 3-4, light green, rough on the surface and chartaceous, 13.5 - 23.5cm long, 4.5 - 5.6cm wide .....*Indocalamus*

GENERA AND SPECIES OF ERECT BAMBOOS FOUND IN THE PHILIPPINES

Field Key to Species, Varieties, Cultivars and Formas

GENUS *ARUNDINARIA* MICHAUX

Arundinaria is a genus of bamboo from temperate countries in Asia like Japan, China, Korea, the Himalayas, the northern part of Indo-China and Madagascar. The genus was described by Michaux in 1803. Since then, the number of species has increased enormously. Many *Arundinaria* species were introduced in Europe, North America, the Philippines and in the mountains of the tropics.

Leaves are green, distichous, puberolous on one side beneath; leaf sheaths are thinly puberolous .....*Arundinaria pygmaea*

Leaves have white or yellow striate, glabrous on both surfaces, leaf sheaths are glabrous .....*Arundinaria argenteostriata*

Scientific name: ***Arundinaria argenteostriata*** **(Regel) Ohwi**

Common/Vernacular name: Variegated dwarf bamboo (English)

Origin and geographical distribution:

Arundinaria argenteostriata is native to Honshu, Shikoku, and Kyushu, Japan. It was introduced to the Philippines for ornamental purposes.

Brief description:

Culms are dense, 30–50cm in height, 1–3mm in diameter and has 2-3 branches per node. Culm and leaf sheaths are glabrous. Nodes are puberolous with retrorse minute hairs or pubescent with long soft ones. Leaf blades are lanceolate, rounded or truncate at the base and rather attenuately acuminate at the apex, 10-14cm long, 15–22cm wide, glabrous on both surfaces, has white or yellow striate; oral setae is white and smooth.

Uses:

A. argenteostriata has beautiful variegated leaves and because of this, they are cultivated/planted for ornamental purposes. They can also be planted as ground cover to prevent soil erosion.

Propagation methods:

A. argenteostriata can be propagated using clump division.

Scientific name: ***Arundinaria pygmaea*** **(Miq.) Mitf**

Common/Vernacular names: Dwarf bamboo, Pygmy bamboo (English); Ke-oroshima–chiku (Japanese)

Origin and geographical distribution:

Arundinaria pygmaea is native to Japan, where it is planted/ grown in pots as a small companion to classical bonsai. It was introduced to the Philippines as a decorative or ornamental plant.

Brief description:

It is a dense, clump–forming species reaching a height of 27–39.5cm and a diameter of 0.03–0.13cm. Internode is yellow green, 4–7.5cm long. Culm sheath is yellow green to purplish at the base, 3.2–3.5cm long, 0.2–0.5cm wide with short, whitish hairs along the margin; auricle has 1mm whitish hairs; ligule has 2mm whitish hairs; sheath blade is green, linear, horizontal and glabrous. Nodes are whitish with the sheath scar and nodal ridge present. There is only one branch 5.5–27.5cm long and 0.5–0.8cm in diameter. Leaves (3–10) are linear, 2–6cm long, 3–6cm wide; petiole is 1mm long and glabrous; leaf sheath is brown to purplish, glabrous, 3cm long, 0.4cm wide with 3mm whitish bristles.

Uses:

A. pygmaea is an aggressive running ground cover. It is also good for holding soil and controlling erosion.

Propagation methods:

This bamboo can be propagated using clump division.

Genus *BAMBUSA* Schreber

The rhizomes of bamboo species under genus *Bambusa* are typically sympodial or clump-forming. Their culms are erect. The culm sheath blades are erect or tardily reflexed, triangular to ovate-lanceolate; and the auricles are typically lobe-like and bristly at the margins. The branch complement has a dominant primary branch, one to several secondary branches and branchlets form its base. The leaf blades are typically obtuse at the base.

Culms with thorny branches especially at the basal portion

Branches and branchlets at the base are only partially thorny or sometimes without thorns .....*Bambusa merilliana*

Branches and branchlets at the base are densely set with more or less strong recurved thorns .....*Bambusa blumeana*

Culms without thorny branches

Culm internodes are inflated near the base or nodes and constricted

Culm sheath is glabrous to slightly hairy at the back, culm sheath is only up to 5mm high .....*Bambusa tuldoides*

Culm sheaths are thickly hairy at the back, culm sheath auricle is larger up to 2cm high .....*Bambusa vulgaris*

Culm internodes are more or less cylindrical

Culms have diameter up to 2cm

Culms are yellowish with green stripes to burgundy red when exposed to sunlight .....*Bambusa multiplex f. alphonso-karri*

Culms are generally green, occasionally with narrow white stripes

Culms are green, sometimes white-waxy; leaves are dark green .....*Bambusa multiplex*

Culms are pale green; leaves are pale green with white striped striations .....*Bambusa multiplex f. variegata*

Culms have diameter more than 2cm

Culms are yellow with unequal width of green stripes .....*Bambusa vulgaris var. striata*

Culms are generally green, occasionally with narrow yellow stripes when young and glabrous, purplish to black with dark-brown spots when old

Culms are green with yellow stripes and turn purple to black or dark brown spots appear when it matures

Culms are green with yellow stripes and dark brown spots on mature ones ...*Bambusa maculata*

Culms are green with yellow striations, there are no brown spots, becomes glabrous when old and turns purplish to black

Culms are green, young ones have yellow stripes and turn purple to black when old .....*Bambusa lako*

Culms are green with yellow stripes without brown spots on mature ones .....*Bambusa philippinensis*

Culms are green without any yellow stripe; culm sheath is glabrous or with whitish to dark brown hairs; sheath blade is erect, corrugated, linear to narrowly triangular to linear-lanceolate to broadly ovate lanceolate

Culm sheath is glabrous; sheath blade is triangular and somewhat corrugated; leaves are linear lanceolate .....*Bambusa dolichomerithalla*

Culm sheath has whitish to dark brown hairs; sheath blade is narrowly triangular to broadly ovate to oblong lanceolate; leaves are linear lanceolate to lanceolate

Culm sheath has whitish hairs at the back, sheath blade is broadly ovate lanceolate; leaves are linear-lanceolate to oblong lanceolate ...*Bambusa atra*

Culm sheaths have dark brown hairs at the back; sheath blade is narrowly triangular; leaves are linear-lanceolate .....*Bambusa vulgaris*

Scientific name: ***Bambusa atra* Lindley**

Common/Vernacular names: Long pipe bamboo (English);
Loleba; Nena (Indonesia)

Origin and geographical distribution:

Bambusa atra is a native of New Guinea, the Moluccas and Sangihe Island. It is planted in many gardens in the Philippines such as the Philippine Bambusetum in Baguio City and the ERDB Bambusetum in Los Baños, Laguna. It is occasionally cultivated in other places such as in botanic gardens in Bogor, Calcutta and Peradeniya.

Brief description:

It is a densely tufted, sympodial bamboo reaching a height of 5-8m, a diameter of 2-4cm and a very thin wall. Its internodes are green, 35-70cm long and has nodes which are not prominent or swollen. It has 2-3 branches at each node in the upper part of the culms. There are 4-16 leaf blades, oblong-lanceolate, 25-50cm long, 8-15cm wide, with 1.5cm long prominent whitish bristles in the auricle.

Uses:

The thin-walled culms of *B. atra* are used locally in basketry and other handicrafts. Strips of culms are used as binding material in roofing, fish traps and screens.

Propagation methods:

B. atra can be propagated by rhizome or branch cuttings.


Scientific name: ***Bambusa blumeana*** **J.A. and J.H. Schultes**

Common/Vernacular names: Spiny or thorny bamboo (English); Kawayan tinik (Philippines); Phai sisuk (Thailand); Fre gai (Vietnam); Bambu duri (Indonesia)

Origin and geographical distribution:

The exact origin of *Bambusa blumeana* is not known, but it is believed to be native in Sumatra, Java, Lesser Sunda Islands and Borneo. It is believed to be introduced in the Philippines in the 1910's and since then has become naturalized and can be found throughout the settled areas at low and medium altitudes. It is found planted in Thailand, Vietnam, Malaysia, and Southern China as well.

Brief description:

Kawayan tinik is a densely tufted sympodial bamboo, with spiny basal branches forming a densely interlaced thicket 2-3m high. The culms are erect, 15-25m tall and 6-10cm in diameter. The internodes are green, 25-60cm long, has 0.5-3cm wall thickness and prominent nodes with the basal ones bearing aerial roots. It usually has three branches, the lower ones spreading horizontally bearing stout, straight or curve spines in groups of 1-5. Leaf blades are linear-lanceolate, 15-20 x 1.5-2cm and have rounded margin, scabrous and are often narrowly acute.

Uses:

It is the most commonly used bamboo in the Philippines. Young shoots are eaten as a vegetable, usually boiled and shredded. The culms are used for construction, basketry, furniture, parquet,

concrete reinforcements, chopsticks, hats and toys. It is often planted along water courses to prevent soil erosion. It is also planted around farm houses as windbreaker and in the field as living fences to make boundaries.

Propagation methods:

B. blumeana can be propagated vegetatively by culm cuttings, branch cuttings, layering, marcotting and tissue culture. However, propagation by culm cuttings is the most practical way to propagate this species.

Scientific name: ***Bambusa dolichomerithalla*** **Hayata**

Common/Vernacular name: Taiwan bamboo (English)

Origin and geographical description:

This species is endemic to Taiwan but is also native to China. It was recently introduced to the Philippines.

Brief description:

Taiwan bamboo has a clump about 1m in diameter with approximately 250 culms. The culms are green, erect, glabrous and 4-8m tall. The young culms are up to 1-7cm in diameter and 10-12m tall with white-waxy bloom. The nodes are solitary and smooth. The internodes are 20-50cm long, 2-3cm diameter near the base and has walls 1-2mm thick. The culm sheath is deciduous, chartaceous, entire, both surfaces are glabrous, 11.5cm long and 1-10cm wide; the auricle is absent; ligules are narrow or inconspicuous and entire; blade is erect, remains attached to the sheath, triangular, glabrous, entire, somewhat corrugated, 6.3-6.5cm long and 0.2-6.5cm wide. Branches are more or less 25 per node, arising from the nodal line and are angled upward except for one dominant primary branch which reaches up to 80cm long. Leaves are 10-35 per branch, linear-lanceolate, the upper surface is glabrous while the lower surface is pubescent and the margin is scabrous; petiole is glabrous and 3.5-6.6cm long; auricle is conspicuous with tuft of bristles; and the ligules are rounded. Inflorescence and fruits not seen.

Uses:

Taiwan bamboo was introduced in the Philippines as an ornamental. In China, it is used in handicraft.

Propagation methods:

Taiwan bamboo can be propagated using offsets and culm cuttings.

Scientific name: ***Bambusa lako* Widjaja n. sp.**

Common/Vernacular names: Timor black bamboo (English);
Au lako meta (East Timor)

Origin and geographical distribution:

Bambusa lako is known to come from East Timor. However, it might also be found in other islands of the Lesser Sunda Islands.

Brief description:

B. lako is a loose, clump-forming bamboo. It has a straight culm 5-15m in height and 2-8cm in diameter with slightly pendulous tips. The internodes are 9-35cm long, have a wall thickness of 0.04-0.12mm, green with yellowish stripes when young and turn purple to black as they mature. Its culm sheath is greenish to brownish when young and purplish on the margin and brown at maturity with a length of 11.5-16.5cm and a width of 12-19.5cm. The auricle is rounded, 4-8mm long, with 7-10mm long brown bristles. Ligule is 2-3mm high and denticulate. There are 3-8 erect branches 13.5-160cm long and 0.1-1.2cm in diameter. It has 5-9 lanceolate leaves 7.5-25cm long and 1.2-3.2cm wide.

Uses:

Culms of *B. lako* are used for walls and for traditional furnitures. It was introduced in Australia in 1970 as an ornamental. It has also been propagated and planted in different gardens in the Philippines.

Propagation method:

It is easily propagated through 1 or 2-node cuttings.



Scientific name: ***Bambusa maculata* Widjaja. n. sp.**

Common/Vernacular names: Spotted or Tiger bamboo (English); Buluh cina, Pring tutul, Awi tutul (Indonesia)

Origin and geographical distribution:

Cultivated for many ages in Java especially on the borders of Central and East Java, *Bambusa maculata* grows wild abundantly in the Moluccas and also in the Lesser Sunda Islands. It is planted in Bali for the furniture industry and is being cultivated in the Philippines as an ornamental, although in some parts of the country, it is also being used for furniture making.

Brief description:

B. maculata is a loose, clump-forming bamboo species, reaching a height of 15-20m and a diameter of 3-8cm. Its internodes are green with whitish to yellowish stripes especially near the base and dark brown spots especially on the mature culm, with a length of 16-30cm and wall thickness of 1-3cm. Culm sheath is 20-35cm long, 25-38cm wide, green with black hair on the outer portion and glabrous on the inner portion. It has 1-7 erect branches, 30-120cm long and 0.3-0.9cm wide. Leaves (4-8) are linear lanceolate, 5-40cm long and 1-6cm wide.

Uses:

B. maculata is used for furniture. The culms are also being used for traditional musical instruments, for construction (wall and flooring) as well as for handicraft.

Propagation method:

It can be propagated by using one-node culm cuttings.

Scientific name: ***Bambusa merrilliana*** **(Elmer) Rojo & Roxas comb. nov.**

Common/Vernacular names: Bayog (Ibanag, Iloko, Sambali, Tagalog), Bayugin (Tagalog), Botong (Bisaya, Bicol); Butong (Panay, Bisaya); Kawayan bayog (Pangasinan)

Origin and geographical distribution:

Bayog is endemic to the Philippines. It can be found in Luzon (Ilocos Sur, Abra, Nueva Ecija, Rizal, Laguna, Zambales, Pangasinan and Bulacan), Visayas (Leyte, Cebu, Bohol) and in Mindanao (Lanao).

Brief description:

Bayog is a clumping bamboo with erect and sturdy culms more or less 20m tall, 8-12cm in diameter and has walls up to 4cm thick. The nodes are solitary, the nodal line and nodal ridge are present with aerial roots especially at the lower nodes. Internodes are green and smooth; the lower ones are up to 30cm long, moderately hollow and sometimes almost solid at the base. Culm sheaths are 20cm long, 25cm wide, narrowed upward to truncate, the outer surface is strongly ribbed, shortly pubescent with brown to black hairs while the inner surface is weakly ribbed, shiny and glabrous. The auricle is 2mm high, has margins and fringed with brown hairs; the blades are 4.5-5cm long, base is 2cm wide, narrowed upward to acute tip, inner and outer surfaces are pubescent, margin is folded. Branches are usually one at each node, sturdy and about 2m long. Leaves are as many as 12 to a branchlet; blades are linear-lanceolate to oblong-lanceolate, 13-26cm long, 1.5-3.3cm wide, glabrous or sparsely puberulent; the base is obtuse to rounded, the margins are weakly scabrous and the

tip acuminate; petiole is short and glabrous; sheaths are longer than the internodes and glabrous; the auricles are not distinct; and the ligule is 1mm and glabrous.

Habitat:

This bamboo is generally planted in settled areas. It prefers deep fertile soil.

Uses:

The culms of bayog are used in building construction and preferred for furniture making and in vehicle shafts or arched poles fitted to the neck of a carabao. The green culms are split and made into ropes. The culms of bayog are also suitable for pulp and paper making.

Propagation method:

One-node culm cutting is the best propagation method for bayog.


Scientific name: ***Bambusa multiplex*** **(Lour.) Raeuschel ex. J.A. and J.A. Schultes**

Common/Vernacular names: Hedge bamboo (English); Bambu cina; Buluh pagar (Indonesia); Kawayan tsina (Philippines); Phai liang (Thailand); Cay hop (Vietnam)

Origin and geographical distribution:

Bambusa multiplex is known only from cultivation. According to PROSEA (1995), it probably originated from Indo-China and Southern China. However, it is now widely cultivated throughout the tropics and subtropics, including Southeast Asia.

Brief description:

B. multiplex is a densely tufted sympodial bamboo. The culms are erect and slender with arching tips, 2.1-3.6m tall, 1-1.4cm in diameter, and 0.2-0.3cm wall thickness. Internodes are yellow-green, 19-21cm long, glabrous, white-waxy when young, and with nodes which are not swollen. Branches are 5-20 or more at each node but the primary branch is hardly prominent. Culm sheaths are light green when young and turn reddish-brown to straw-colored and glabrous. Leaves are 4-13, linear-lanceolate, 2.5-7cm long and 0.8-1.3cm wide.

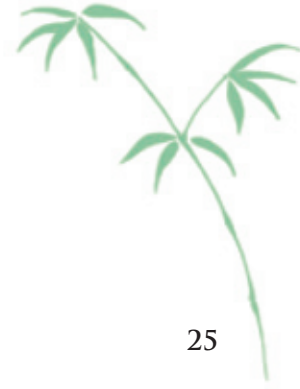
Uses:

B. multiplex makes an excellent hedge and is a common ornamental in gardens. It is usually used as umbrella handles and as fishing poles. In Indonesia and Thailand, it is used to make handicrafts. In Taiwan, it is planted as a windbreaker. Several dwarf and variegated cultivars are attractive pot plants.

Propagation methods:

B. multiplex is usually propagated by rhizome cuttings or offsets. For hedges, the propagules are planted close together.

In well-established hedges, the plants are pruned regularly to maintain a good height. When the hedges are not pruned, the plants will grow to full height and form a compact hedge with arching tips.



Scientific name: ***Bambusa multiplex f. alphonso-karri***

Common/Vernacular names: Alphonse Karr (English);
Sunburn (Philippines)

Origin and geographical distribution:
Alphonse Karr is a sub-tropical species.

Brief description:
It is a densely tufted, clump-forming bamboo species which reaches a height of 2.2-3m, 0.5-1.9cm diameter and 0.3-0.7cm wall thickness. Internodes are yellow with green stripes 3.3-5.8cm long and 0.9-1.5cm wide; the auricle has about 8mm long, dark brown and curly bristles. Branches (20-30) are very small, unequal in size, 10-30cm long and 0.8-0.25cm in diameter. Leaves (4-8) are linear, 2.5-5cm long, 0.5-0.8cm wide, upper and lower surfaces are glabrous; leaf sheath is brownish, very hairy, 1-2cm long and 0.3-0.4cm wide; and the auricle is very hairy.

Uses:
This very beautiful bamboo can be used as an indoor ornamental plant or for interior plantings.

Propagation method:
Alphonse Karr can be propagated through clump division.


Scientific name: ***Bambusa multiplex*** **(Lour.) Raeuschel ex J.A. and J.H. Schultes forma variegata (Carnes) Hatiesima**

Common/Vernacular names: Variegated bamboo (English); Henshou-chiku (Japanese)

Origin and geographical distribution:

This species probably originated from Indo-China and Southern China but is now widely cultivated throughout the tropics and subtropics including Southeast Asia. It is now widely cultivated and sold in different parts of the country especially in commercial gardens.

Brief description:

This bamboo is similar to the typical form except that this has white stripes on the leaves and some on the branches and culms. It is also shorter in stature than the typical form.

Habitat:

Variegated bamboo is cultivated only at low and medium altitudes and thrives well in sandy loam soil.

Uses:

This species is commonly cultivated as hedge and planted in gardens as ornamental.

Propagation method:

This bamboo can be propagated using branch cuttings.

Scientific name: ***Bambusa philippinensis*** **(Gamble) McClure**

Common name: Laak (Tagalog)

Origin and geographical distribution:

Laak is found abundantly in Davao del Norte, Philippines. However, they are also introduced and planted in different parts of the country (i.e., in the bambusetum in Los Baños, Laguna).

Brief description:

The clump is loosely tufted. The culms are slender with more or less 110 in a clump, about 20m tall, 7.6cm in diameter and 0.8cm wall thickness. The internodes are green with cream to yellowish stripes of unequal width near the base and sometimes with prominent reddish brown to black appressed hairs especially on the upper internodes which are about 28–40cm long. The nodes have a black nodal line.

Culm sheaths are green, but some parts are orange to reddish on the outside when young, 20cm long, 24cm wide, densely black and hairy on the back; the auricle is very conspicuous with reddish brown cilia about 1.3cm long; blades are triangular with earlike appendages on the lower edges and also bear ciliate hairs; ligule is not so prominent, about 0.5cm high with irregularly waved and minutely hairy edge. Branches are more or less six per node, usually with one big primary branch. The leaves are usually 12cm long, 1cm wide and glabrous on both surfaces; leaf sheaths have few fine hairs at the top portion; auricles are 0.1mm high; and the petiole is 0.2-0.5cm long. Inflorescences are not seen.

Habitat:

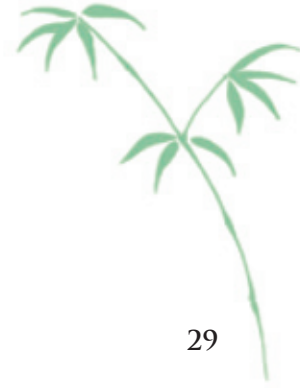
Cultivated at low and medium altitudes.

Uses:

In Davao, and in other parts of the country, laak is widely used as banana props.

Propagation methods:

Laak can be propagated easily by using culm or branch cuttings collected from 1.5-2-year-old culms.



Scientific name: ***Bambusa vulgaris*** **Schrad ex.Wendl**

Common/Vernacular names: Bamboo ampel (Indonesia); Buloh kuning (Peninsular Malaysia); Kawayang kiling (Philippines); Wanet (Myanmar); Phai luang (Thailand)

Origin and geographical distribution:

Bambusa vulgaris probably originated from Tropical Asia. It is most widely cultivated throughout the tropics but is also found spontaneously or naturalized on riverbanks. In Southeast Asia, this bamboo is the most commonly encountered cultivated bamboo, which is found everywhere in villages and riverbanks. It is also considered as an ornamental.

Brief description:

B. vulgaris is open, not densely tufted sympodial bamboo. The culms are erect, sinuous or slightly zigzag, 10-20m tall, 4-10cm in diameter, and has a wall thickness of 0.07-0.15cm. The internodes are glossy green, 20-45cm long, white-waxy when young with appressed dark brown hairs and become smooth and shiny with age. It can have 1-3 branches, arising from the midculm nodes upward. Culm sheath is more or less broadly triangular, light green or stramineous, covered with appressed black hairs. Leaves are usually 5-11, linear-lanceolate, 6-30cm long and 2.0-6.5cm wide.

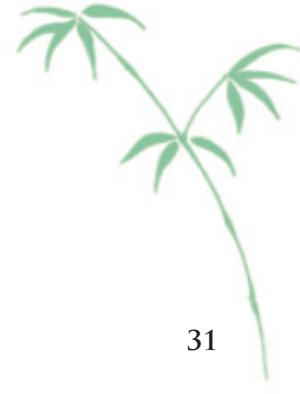
Uses:

According to PROSEA (1995) it is the most used of all bamboos. It it used in making boats for masts, rudders, outriggers and boating

poles, for fencing and as props. However, it is rarely used as a building material because it very susceptible to powder post beetle attack.

Propagation methods:

B. vulgaris is very easy to propagate. It can be propagated using rhizome, culm and branch cuttings. However, the easiest and most commonly used method is by culm or branch cuttings. One-node cuttings can be cut from 1.5-2-year-old culms for best results. It can be propagated easily without using any rooting hormone.



Scientific name: ***Bambusa vulgaris*** **Schrad ex Wendl var striata (Lodd. ex Lindl.) Gamble**

Common/Vernacular names: Green stripe bamboo, Golden/Yellow bamboo (English); Kawayan dilaw (Philippines)

Origin and geographical distribution:

It is cultivated throughout the tropics and in the United States, Puerto Rico, and Nicaragua. It is also found in the Science Centre of the Chinese University of Hongkong, in Java, Malaysia and Singapore. It is planted in different parts of the Philippines as an ornamental.

Brief description:

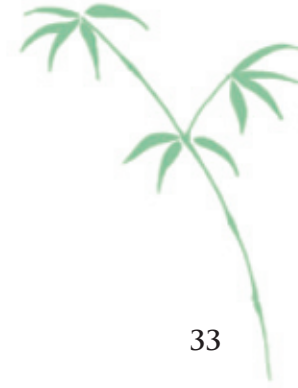
Golden or yellow bamboo is a loose, clump-forming bamboo species reaching a height of 9-12m, 5-10cm in diameter and a wall thickness of 0.6-0.8cm. Its internode is yellow with green stripes of various widths. The nodes are smooth, solitary, has a dipping nodal line and basal nodes with 5cm long aerial roots. There are 9-10 branches 1.2-2.7m long, yellow with green stripes and angled upward. Leaves (4-9) are linear-lanceolate, 7-9cm long, 1-4.5cm wide; the petiole is 1-3mm long, the lower surface minutely pubescent while the upper surface is glabrous and the margins are scabrous. The culm sheath falls early, has orange to light green stripes, 15.9cm long, 28cm wide, and the outside portion is densely covered with appressed dark brown hairs from top to bottom.

Uses:

Yellow bamboo is obviously cultivated as an ornamental. However, it is also used for fine handicrafts, pipes for small irrigation, container for water or other liquids and for basketry. In Java, its shoots are eaten.

Propagation method:

Yellow bamboo is very easy to propagate using a one-node culm cutting.



Scientific name: ***Bambusa vulgaris*** **Schrad. ex. Wendl cv. Wamin McClure**

Common/Vernacular name: Wamin (Myanmar and Philippines)

Origin and geographical distribution:

Wamin bamboo is native to Southern China and is now commonly planted as an ornamental in Southeast Asia and New World tropics and subtropics. Here in the Philippines it is planted as an ornamental in different bambuseta and bamboo gardens (i.e., at the Los Baños Experiment Station of the Ecosystems Research and Development Bureau in College, Laguna).

Brief description:

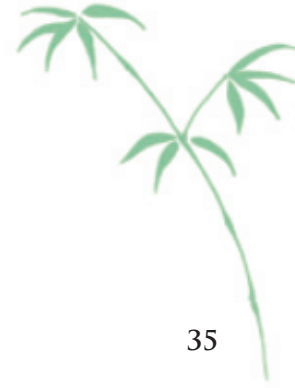
The culms of wamin bamboo are close together, forming dense clumps. The culms are green, 3-5m tall with the top portion slightly drooping. The nodes are beset with aerial roots near the base and the nodal lines are dipping. Its internodes are green, 3-10cm long, inflated especially the basal part, 1.8-2.1cm in diameter and 0.6-0.9cm wall thickness. It has generally one branch but on rare occasions there can be five or more. Leaves on the upper and lower surfaces are glabrous. Culm sheath is green when young with dark brown to black hairs at the back; the auricle is raised up to 2cm high with 2cm pale brown bristles; and the blade is erect and broadly lanceolate.

Uses:

Wamin bamboo is usually used as an ornamental plant preferred for landscaping and is cultivated in pots.

Propagation method:

Wamin bamboo can be propagated easily using one or two-node cuttings. A two-node branch should be left attached to the culm cutting.



Genus *CHIMONOBAMBUSA* Makino

The Japanese name of genus *Chimonobambusa* means "bamboo shooting out in old winter". There are about ten species in China where it originated. It reaches a height of 2-5m and a diameter of 1-2cm. The culm sheath is thin, light brown and has small brown dots all over. The leaves are glabrous, 6-15cm long and 6-12mm wide.

Culms color light brown to reddish; culm sheath is greenish and purplish at the top; leaves are green and sometimes have white striations; leaf sheath is yellow green ..*Chimonobambusa marmorea*

Culm color is brownish to purplish to black as it matures; culm sheath is light green with dark brown spots; leaves are green; and the leaf sheath is purplish .....*Chimonobambusa neopurpurea*

Scientific name: ***Chimonobambusa marmorea*** **Makino**

Common/Vernacular names: Kanchiku (Japan);
Marble bamboo (English)

Origin and geographical distribution:

Kanchiku originated in Southwest China but is also native to Japan. It has been introduced recently in the Philippines and can be found planted at the ERDB bamboo garden in College, Laguna and in some other gardens in the province.

Brief description:

The culms grow to a height of 3-4m and about 1cm in diameter. The culms are somewhat purplish in color and are quite thick-walled. Nodes are prominent, light brown, with a persistent culm covered with white hairs at the base. There are typically three branches (one short and two long branches), 10-12cm long and 0.1-0.2cm in diameter. Leaves (3-6) are green, lanceolate, 2.8-7.7cm long and 0.7-0.8cm wide; the petiole is 1cm and glabrous; leaf sheath is yellow green, glabrous, 2.8-5cm long and 0.2-0.3cm wide.

Uses:

Kanchiku is ideal for planting in parks because of the purplish color of the internode and the big, lustrous nodes.

Propagation method:

Kanchiku can easily be propagated by clump division.

Scientific name: ***Chimonobambusa neopurpurea***

Common/Vernacular names: Purple bamboo (English);
Ground cover bamboo (China)

Origin and geographical distribution:

Chimonobambusa neopurpurea is native to China. It was introduced to the Philippines in 2008 and was planted and propagated at the Benguet State University (BSU) in La Trinidad, Benguet. From the BSU, it was introduced in different parts of the country.

Brief description:

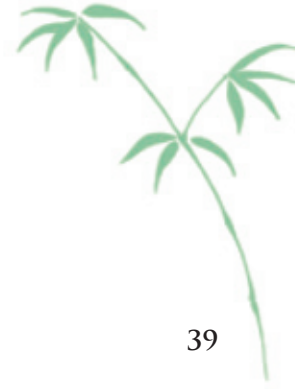
C. neopurpurea is a running bamboo with monopodial rhizome system that reaches a height of 1.2-2.3m and a diameter range of 0.6-0.8cm. Internode color is black or purple, with a length of 8.3-9.5cm and wall thickness of 0.1cm. Culm sheath is light green with dark brown spots, 2.8-8.5cm long, 2.1-2.8cm wide; the auricle has 5mm yellowish bristles; the blade is yellow green while the upper portion is purple. Nodes are purplish with roots at the first to fourth node. There are three branches of unequal sizes, 12-28cm long and 0.1-0.2cm diameter. Leaves (3-4) are lanceolate, 6-14.8cm long and 0.7-2.4cm wide; petiole is 1-2mm; leaf sheaths are purplish, 2.4-4.8cm long and 0.3-0.6cm wide; and the auricle is purplish with 6.3mm yellowish bristles.

Use:

C. neopurpurea is being planted as an ornamental plant.

Propagation method:

This bamboo can be propagated through clump division.



Genus **DENDROCALAMUS** Nees

Rhizomes under this genus are sympodial or clump-forming. Culm sheath blades are either erect or variously at angle with the axis. The auricles are either lobe-like and bristly on the margin, low or distinct. There is a branch complement at the middle portion of the culm with a dominant primary branch and one to several secondary branches with usually smaller branchlets coming from its bases.

Culm diameter at breast height is generally below 10cm.

Culm sheath blade is erect, abaxial side is slightly hairy towards the top, leaf blade small 10-17cm long and 1.5-2.5cm wide; culm wall is solid to almost solid near the base .....*Dendrocalamus strictus*

Culm sheath blade is spreading to reflexed, without hairs on the abaxial side, leaf blades are long, 15-50cm long and 2.5-7.5cm wide.

Culm sheath is usually densely hairy with brownish hairs outside toward the upper half when young; the sheath blade is usually shorter than half of the culm sheath length .....*Dendrocalamus brandisii*

Culm sheath is entirely densely hairy with brownish hairs outside; the sheath blade is usually longer than half of the culm sheath length .....*Dendrocalamus membranaceus*

Culm diameter at breast height is usually over 10cm.

Internodes at the basal portion are thickly covered with brown velvety hairs; the nodes are raised and usually densely set with aerial roots .....*Dendrocalamus asper*

Internodes at the basal portion are green, sometimes thickly white-waxy when young; the nodes are thinly set with aerial roots .....*Dendrocalamus latiflorus*

Scientific name: ***Dendrocalamus asper*** **(Schultes et.) Backer ex Heyne**

Common/Vernacular names: Giant bamboo (English); Bambu betung (Indonesia); Buloh betong (Malaysia); Botong/Butong (Philippines); Phai-tong (Thailand); Mah tong (Vietnam)

Origin and geographical distribution:

The origin of *Dendrocalamus asper* is not certain, but it is thought to be somewhere in Southeast Asia. It is planted throughout Tropical Southeast Asia and has become naturalized. It has been introduced to other tropical countries like Madagascar, Sri Lanka and the Philippines.

Brief description:

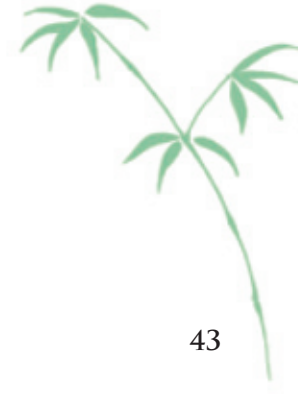
It is a densely tufted, sympodial bamboo with erect culms, pendulous tip, 20-30m tall, 8-20cm in diameter and has a wall thickness of 11-36mm. When young, the culms are covered with fine, velvety golden-brown appressed hairs but become glabrous at maturity. Internodes are 10-50cm long, swollen nodes, bearing many aerial roots. There are many small (approximately 4-15) and short branches at the basal nodes. The culm sheath is 20-40cm long, 22-25cm wide and is smallest at the lower part covered with dark to pale brown hairs. The blade is lanceolate, erect at first but turns deflexed. The ligule is about 10mm long and lacerate. The auricles are prominent bearing slender bristles along the edges. Dark brown to black hairs cover the young shoot which has small and deflexed blades.

Uses:

The culms of *D. asper* have thick walls, are very strong and durable, hence, they are used as building material for houses and bridges. They are also used as container for water or to collect juice being tapped from palm inflorescences. The young and tender shoots are consumed as a vegetable. The shoots of this species is the best among those of other tropical Asiatic bamboo.

Propagation methods:

D. asper can be propagated by rhizome, culm, and branch cutting. However, the most common and practical way of propagating it is through the branch cutting, wherein the culm can still be used for other purposes.



Scientific name: ***Dendrocalamus brandisii*** **(Munro) Kurz**

Common/Vernacular names: Wabo (Myanmar);
Phai–bongyai (Thailand)

Origin and geographical distribution:

The origin of *D. brandisii* is not known. Its native area extends from Northeastern India, Myanmar, to Northern Thailand, Indo-China, China (Yunnan province) and the Andaman Islands (India). It is also frequently planted in botanical and experimental gardens in the tropics and subtropics. In the Philippines, it is planted at the Bambusetum of the Los Banos Experimental Station of ERDB in College, Laguna.

Brief description:

It is a loosely tufted, clump–forming bamboo with erect culms and pendulous tip, reaching a height of about 30m, a diameter of 15-20cm at the base and 2.5-4cm wall thickness. The culms are ash–grey or greenish grey to dull green and dirty yellowish–grey tomentose when young. Internodes are 30-60cm long with a shiny brown pubescent transverse band below and above the nodes.

Nodes are slightly swollen and the supranodal line is distinct with aerial roots on the lower half of the culm. Branches usually arise from the upper midculm part while the lower half is usually more or less branchless but with a tuft of slender branches near the base; primary branches are dominant while the secondary branches are slender. Culm sheath is 40–60cm long, 20–35cm wide, longer than the internodes, rounded at the top, whitish-brown, thick, leathery, early deciduous and covered with black hairs when young; sheath blade is

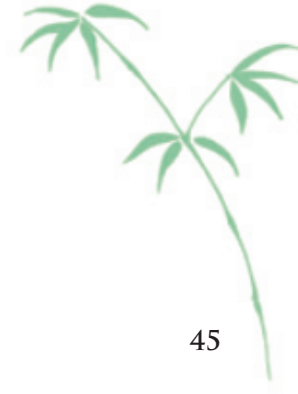
lanceolate to long acuminate, 15-46cm long, 8–13cm wide, reflexed, deciduous and appressed hairy within; ligule is continuous with the sheath top, 1-2cm long, deeply lacerate; auricles are not reaching the edge of the sheath, up to 2cm long, slightly pleated and bear bristles. Leaves are oblong lanceolate, 20–30cm long, 25–50cm wide, the upper surface is pale green and glabrous while the lower surface is slightly whitish and sparsely pubescent; leaf sheath is striate, pubescent when young with long deciduous cilia at the mouth.

Uses:

The culms of *D. brandisii* are used for building purposes, furniture, farm implements, baskets, and other woven wares and handicraft. Young shoots are edible.

Propagation methods:

D. brandisii can be propagated by seed and rhizome cuttings. Some seeds are usually available after sporadic flowering and constitutes a good source for propagation. Rhizome cuttings (part of rhizome and part of culm with roots and dormant buds) can always be taken and are planted just before or during the rainy season in holes enriched with a mixture of cow dung and soil.



Scientific name: ***Dendrocalamus latiflorus*** **Munro**

Common/Vernacular names: Taiwan bamboo, Ma bamboo (English); Bambu Taiwan (Indonesia); Botong (Philippines); Wani (Myanmar); Machiku (Japan)

Origin and geographical distribution:

The origin of *Dendrocalamus latiflorus* is not known, but it is distributed in Myanmar, Southern China and Taiwan where it is also found in cultivation. It has also been introduced in India, Thailand, Japan, Philippines and Indonesia. In its area of natural distribution, *D. latiflorus* occurs under subtropical conditions as in Northern Taiwan where it is found in up to 1000m altitude, tolerating temperatures as low as -4˚C. It prefers high rainfall and grows best in moist, fertile soils.

Brief description:

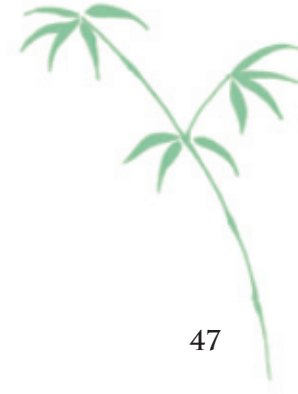
It is a densely tufted sympodial bamboo which reaches a height of 15-25m, 7.3-20cm in diameter and wall thickness of 0.5-3cm. Internodes are green, 21.5-41cm long, smooth and covered with white wax when young. Nodes are rather prominent, the lower portion has over beaming aerial roots surrounded by a ring of brown silky hairs above and below the sheath scar. Branches (4-14) are usually distinctly larger, 35-350cm long and 0.2-1.8cm in diameter. Leaves (3-16) are lanceolate, 5.5-35cm long, 2-5.5cm wide with 6-8mm long petiole. Leaf sheaths are yellow green with yellowish stiff hairs, 6-12.5cm long and 0.6-1.4cm wide. Culm sheath is yellow green, 30-39.8cm long, 30-32.5cm wide and with dark brown hairs on the outer portion. Sheath blade is narrowly triangular, 4.5-4.8cm long, 1.1-1.3cm wide, reflexed and glabrous.

Uses:

D. latiflorus is usually cultivated for its delicious young shoots. Mature culms are used as water pipes, to make rafts for fishing, for weaving baskets and for making paper pulp. The leaves are used to make hats, roofs for boats and as material for packing.

Propagation methods:

D. latiflorus can be propagated by seeds, rhizomes and culm cuttings. Cuttings are taken from 2-year-old culms, 50cm long (2-nodes). Two-year-old rooted cuttings are preferably planted in the field during the rainy season.



Scientific name: ***Dendrocalamus membranaceus*** **Munro**

Common/Vernacular names: Waya (English and Myanmar);
Phai-sangnuan (Thailand)

Origin and geographical distribution:

Dendrocalamus membranaceus is native to Thailand, Myanmar, and Laos. It is occasionally cultivated in its native area and has been introduced in many bamboo and botanical gardens in India, Indonesia and the Philippines.

The natural habitat of *D. membranaceus* is a tropical mixed deciduous or monsoon forest below 1000m altitude. In Northeastern Thailand, where *D. membranaceus* is native, annual average minimum temperature is 21.7˚C and the average annual rainfall is 950mm with a dry season from November to April.

Brief description:

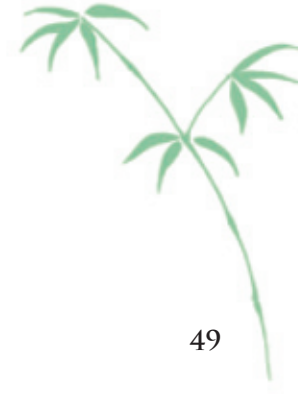
It is a clump-forming bamboo, which forms a rather open clump. Culms are very straight, 20-24m tall, 6-10cm long, 6-10mm wall thickness, covered with white powdery deciduous scurf when young and turn green on maturity; internodes are 22-38cm long. Nodes are prominent, the basal ones have aerial roots. Branches (1-3) are 21-250cm long, 0.26-2.34cm in diameter, the upper ones are slender and drooping. Leaves (6-8) are lanceolate, 12-15cm long, 1.5-2.5cm wide and have 1-2mm long petiole; leaf sheath is 2.5-6cm wide with stiff, whitish bristles.

Uses:

Culms of *D. membranaceus* are used for building purposes, bamboo board, furniture, basketry, matting and handicrafts and as props for fruit trees. They are said to be very promising for the production of paper pulp. Young shoots have slightly bitter taste but they are smooth and easy to handle.

Propagation methods:

D. membranaceus can be propagated by seeds and by rhizomes and culm cuttings. Fresh seed has a germination percentage of 90% and remains usable for a period of six months (60%) and 80% if stored at 4-5˚C.



Scientific name: ***Dendrocalamus strictus*** **(Roxlo.) Nees**

Common/Vernacular names: Male bamboo, Solid bamboo (English); Buloh batu (Malaysia); Myinwa (Myanmar); Phai-sang (Thailand)

Origin and geographical distribution:

Dendrocalamus strictus is widespread and native in India, Nepal, Bangladesh, Myanmar and Thailand. It is also planted in experimental or botanical gardens in Sri Lanka, Indo-China, Indonesia, Malaysia, Puerto Rico, Cuba, United States and the Philippines. It occurs naturally in tropical and subtropical regions of South Asia. The optimum mean annual temperature is between 20-30˚C, but it can withstand extremes as low as -5˚C and as high as 45˚C. Optimum annual rainfall is between 1000-3000mm with 300mm per month during the growing season. It is however, a very drought resistant tropical bamboo, still growing rather well with 750-1000mm rainfall per year. It is found from sea-level up to about 1200mm altitude, particularly on hilly ground with cooler and drier conditions. It grows on all soils with good drainage, preferring sandy loams on stony subsoil with pH 5.5-7.5.

Brief description:

It is a densely tufted sympodial bamboo with culms reaching a height of 6-20m, 2.5-12.5cm in diameter, thick-walled or almost solid, glabrous when young and turns dull green or yellowish as it matures. Internodes are 30-45cm long. Nodes are somewhat swollen, basal nodes often with aerial roots. There is one dominant branch at the center. Leaves (4-9) are lanceolate, 3.5-30cm long and 0.6-2.5cm wide, has 1-3mm petiole at the upper surface with soft hairs, the

lower part is rough and hairy. Culm sheath is yellow green to purplish, 8-30cm long; blade is erect, triangular, with stiff narrow tips and is hairy on both sides. Young shoot is brownish-green with very thick dark brown hairs and short apex.

Uses:

The culms are used for making baskets and handicrafts.

Propagation methods:

D. strictus can be propagated using seeds, rhizomes and culm cuttings. It can also be propagated using tissue culture.

Genus **GIGANTOCHLOA** Kurz

The rhizome of the species under this genus is sympodial or clump-forming. The culms are erect. The culm sheath blades are erect, spreading or reflexed, green when young; auricles are low and rim or lobe-like and glabrous or with bristles or the margin buds at each node are solitary. Branch complement at the middle portion of the culm has a dominant primary branch and with one to several secondary branches on each side at its base.

This genus is composed of about 25 species and is indigenous to Myanmar, Thailand, Indo-China and Peninsular Malaysia. According to Holttum (1958) the *G. levis* in the Philippines, Borneo and Guam is not native to these islands and is believed to be introduced by migrants from the mainland Asia. In the Philippines, *G. levis* has been naturalized and noted earlier by Merrill (1923) as an introduced species centuries ago.

Culms are plain green; the internodes are densely covered with rough dark brown hairs at the basal portion without any white powder.....*Gigantochloa levis*

Culms are green but changes color as it matures (i.e., presence of whitish rings at the nodes and yellow to pinkish or purplish striations)

Culm has white wax when young and covered by scattered black hairs but turns glabrous, green with yellow striations or green with pinkish to purplish striations .....*Gigantochloa kuring*

Culms are dark green when young and turn greenish to dark brownish-purplish with age with distinct pale or whitish rings at the nodes covered by dark brown glabrescent hairs .....*Gigantochloa atroviolacea*

Scientific name: ***Gigantochloa atroviolacea* Widjaja**

Common/Vernacular names: Black bamboo (English);
Bambu hitam (Indonesian)

Origin and geographical distribution:

Gigantochloa atroviolacea is only known from cultivation and its origin is unknown. It is widely cultivated in Central and West Java and introduced in different parts of Indonesia. It is also planted in botanical gardens in India, Sri Lanka, Thailand and Philippines in the 1980s.

G. atroviolacea grows well in the perhumid lowland tropics, with annual rainfall of 1500-3700mm and average temperature of 20-32˚C. In Java, it occurs mostly on red and reddish-brown latosoils and lateritic soils, but it prefers drier limestone soils. In dry areas, the purplish color of the culms is much prominent.

Brief description:

G. atroviolacea is a densely tufted, clump-forming bamboo. Culms are 10-15m tall, 6-8cm in diameter with walls up to 0.8cm thick, dark green when young but turns greenish to dark brownish-purple with age, it has distinct pale or whitish rings at the nodes and covered with dark brown hairs. Internodes are 40-50cm long; basal nodes have aerial roots. There are 1-3 dominant branches and plenty of small branches 0.05cm in diameter, 12-300cm long and 0.05-1.5cm wide. Leaves (5-18) are lanceolate, 4.5-30.5cm long, 1-4cm wide with dark brown hairs 11-19.5cm long and 3.5-4.5cm wide. Culm sheaths are green, 16-20cm long with dark brown appressed hairs on the back;

sheath blade is ovate to oblong, 4-9cm long, and spreading to reflexed. Young shoots are slender, dark green-brown, sometimes with a light green flash on the tips of the blades.

Uses:

In Indonesia, it is used to make famous bamboo musical instruments (anklung, calung, gambang and celempung). The blackish color of the culm has caught the attention of the handicraft and furniture industries. In some countries like the Philippines, *G. atroviolacea* are planted as ornamentals. The shoots are edible, it turns yellow-purplish after cooking.

Propagation methods:

G. atroviolacea is propagated only by rhizome or culm cuttings. Culm cuttings should be taken from 1.5-2-year-old culms.

Scientific name: ***Gigantochloa kuring*** **Widjaja**

Common/Vernacular names: Pink bamboo (English);
Buluh kuring biasa (Malay)

Origin and geographical distribution:
Found in Sumatra, Eastern part of the Bukit Barisan Range.

Brief description:
It is a densely tufted, sympodial or clump-forming bamboo. Culms are erect, reaching a height of 7-13m, diameter of 2-7cm and 8-10mm wall thickness. Young culms have white wax and are covered with scattered black hairs; it is glabrous when old, green with yellow striations or green with purplish striations. Branches (6-12) are 15-200cm long and 0.01-1.06cm in diameter. Leaves (5-14) are lanceolate, 12.3-23.9cm long, 1.6-2.2cm wide and has 1.5-6mm long petiole; leaf sheaths are green, hairy outside, glabrous inside, 6-13.5cm long and 0.7-1.5cm wide. Culm sheath is persistent, green tinged with orange, covered with black hairs and 10.5-16cm long; and the sheath blade is yellow green, triangular, deflexed with appressed dark brown hairs.

Uses:
Used in Indonesia for building purposes and in traditional basketry. In the Philippines, it is cultivated mainly as an ornamental.

Propagation methods:
G. kuring is propagated using a one-node culm cutting taken from a 1.5-2-year-old culm.

Scientific name: ***Gigantochloa levis*** **(Blanco) Merrill**

Common/Vernacular names: Bolo (Philippines); Poring (Malaysia); Buluh betung (Brunei); Buluh suluk (Indonesia)

Origin and geographical distribution:

The origin of *Gigantochloa levis* is unknown. It is commonly cultivated in the Philippines and in Northern and Western Borneo. In the Philippines, it has apparently naturalized to a certain extent.

Brief description:

Bolo is a densely tufted, sympodial bamboo, 13-20m tall and 5-10cm in diameter. The culms are erect, green with 1.0-1.2cm wall thickness. It is densely covered with dark brown hairs all over the base of the culms. The culm sheath is covered with dark brown hairs on the outside portion. Auricle lobes are 10mm long with 5-20mm long bristles. The ligule is 2-4mm long with 7-15m long laceration. Nodes are not swollen with aerial roots found in 1-2 nodes. Branches are dominant and subdominant with several lesser leafy branchlets from the secondary branches, 23-350cm long and 0.2-1cm in diameter. There are 3-15 lanceolate leaves 8-35cm long and 2-7cm wide. Lower surface of the leaf is light green and pubescent. The leaf sheath is yellow green with yellowish stiff hairs.

Uses:

Culms are used in building construction, basketry and furniture and as materials for scaffolding and fishpens. Shoots are also edible.

Propagation methods:

G. levis is propagated by rhizome or culm cuttings. Culm cutting 50cm in length, including a well-developed branching node, should be cut/prepared and planted in a nursery.

Genus **GUADUA** Kunth

The rhizomes of the species under the genus are sympodial or clump-forming. The culms are erect, internodes are cylindrical or sometimes deeply sulcate above the point of insertion of a bud or a branch complement and hollow. Branch buds at culm nodes are typically solitary. Branches at the lowest nodes of the culms are typically thorny in all species. Currently more or less, there are 27 species confined in the New World (i.e., from Mexico to all countries of the Central and South America, except Chile).

Culms are close together forming a clump. Culms are erect, broadly arching above reaching 30m high. Internodes are open, 2-9cm in diameter, the wall is 0.4-2.5cm wide at the upper and inner internodes. Culm sheath is densely hairy outside; the blade is roughly triangular; the auricles are inconspicuous. Branches are usually solitary and spiny, rarely three with one dominant at the center .....*Guadua angustifolia*

Scientific name: ***Guadua angustifolia*** **Kunth**

Common/Vernacular name: Iron bamboo (English)

Origin and geographical distribution:

Guadua angustifolia can be found from tropical Northeastern South America to Panama. It was introduced in the Philippines for experimental purposes (i.e., at the Los Baños Experiment Station of the ERDB, College, Laguna) but it can also be found in other bambuseta and gardens in different parts of the Philippines.

It grows on rich to medium soils, especially along rivers and on hilly ground.

Brief description:

The culms of *G. angustifolia* are close together forming clumps. The culms are erect and reach a height of 20-30m. Internodes are green, 2-9cm in diameter, have a wall thickness of 0.4-2.5cm, with a whitish ring about 2-2.5cm wide at the upper and lower internodes. Branches are solitary and spiny at the lower node, rarely three with one dominant at the center. Leaves (3-23) are ovate-lanceolate, 8-20cm long, 1.8-4.5cm wide, have a rounded base with 3-4mm long petiole; upper and lower surface are glabrous; the leaf sheath is yellow green with stiff whitish hairs, 5-7.5cm long and 5-10cm wide. The culm sheath is 27.5cm long, 20.4cm wide, outside surface is densely hairy while the inside is smooth.

Uses:

G. angustifolia is considered one of the highest – quality timber species in tropical South America. As such, it is most extensively used as building materials for low–cost housing and other construction.

This species is well known for the protection of river embankments and reduction of soil erosion. It is also good in water conservation .

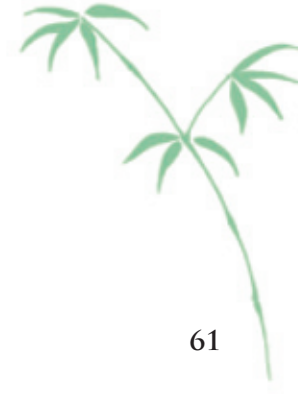
Propagation methods:

G. angustifolia can be propagated easily using one-node cutting with a two-node branch.

Genus **HIBANOBAMBUSA** Maruyama et. H. Okamura

The name of the genus means "bamboo growing in Mt. Hiba" in Nagi Country, Shimane Prefecture. The rhizome is sympodial or clump-forming, the culms at the base are bent, the leaves are large and the oral setae is well-developed. The genus flowered from 1970-1972 but it never bore seeds.

Culm and culm sheaths have numerous white stripes. The leaves are big, wide and have many white stripes .....*Hibanobambusa tranquillans* f. Shiroshima



Scientific name: ***Hibanobambusa tranquillans*** **f. Shiroshima H. Okamura**

Common/Vernacular name: Shiroshima-inyo (Japan)

Origin and geographical distribution:

Shiroshima bamboo is found growing in Mt. Hibanogi country, Shimane Prefecture, Japan. However, it has been introduced recently in different parts of the Philippines. It can be found in gardens in Laguna and Cagayan de Oro.

Brief description:

It is a clump-forming species, reaching a height of 1-3m and 1.2-1.8cm in diameter. The internode is 16-20cm long, green with few white stripes. Culm sheath is green, purplish on the margin, 7.5-9cm long, 4-5.5cm wide and has dark brown hairs at the basal portion; sheath blade is green with white stripes on the margin, erect and narrowly triangular. Nodes are purplish with the sheath scars and nodal ridge dipping. Branches (3-5) are 18-90cm long, 0.2-0.9cm in diameter, ascending and without thorns. Leaves (4-12) are lanceolate, 8.5-19cm long, 2-3.5cm wide, has a 2-3mm long petiole, the lower surface is light green with white striations; leaf sheath is yellow green, glabrous, 2-8.5cm long and 0.8-1cm wide; and the auricle is not prominent.

Use:

Shiroshima bamboo is a very beautiful ornamental bamboo.

Propagation method:

It can be propagated using clump division.

Genus **INDOCALAMUS** Nakai

Several species of *Indocalamus* are known in South and Middle China while only one species is known in Japan. In Kagoshima, a remote island in Kyushu, large clusters of *Indocalamus* are seen. The branches are thicker than the culm and the young culms become zigzag. The leaf blade is light green, rough on the surface and chartaceous.

Culms are light green; the culm sheath is yellow green and glabrous; the auricles are dark brown with plenty of 1mm brown bristles; the leaves (3-4) are big, 13.5-23.5cm long and 4.5-5.6cm wide; the leaf sheath is brownish with light brown hairs and has auricles with plenty of 12mm purple bristles .....*Indocalamus decorus*



Scientific name: ***Indocalamus decorus***

Common/Vernacular name: Groundcover bamboo (English)

Origin and geographical distribution:

Indocalamus decorus was introduced to the Philippines from China. It was brought to the Benguet State University in La Trinidad, Benguet in 2008. Since then, it is being propagated and distributed to different organizations in Benguet and in other parts of the country.

Brief description:

It is a running bamboo reaching a height of 0.49–0.66m and a diameter of 0.2–0.6cm. Internode is light green and 9.5–11.9cm long. Culm sheath is yellow green, 2.8–7cm long, 0.5–2.3cm wide and glabrous; auricle is dark brown with plenty of 7mm brown bristles; sheath blade is yellow green, 3.1–3.6cm long, 0.6cm wide, erect with whitish wax when young. The node is brownish, sheath scar and nodal ridge are present. There are three erect branches, 2.9–8.3cm long and 0.1cm in diameter. Leaves (3–4) are lanceolate, 13.5-23cm long, 4.3–5.6cm wide and glabrous on both sides; petiole is 2–3mm; leaf sheath is brownish, 3.8–7cm long and 0.3–0.9cm wide with light brown hairs; and the auricle has plenty of 12mm purplish bristles.

Uses:

This bamboo can be used as an ornamental and as a ground cover.

Propagation method:

This bamboo can be propagated using rhizome cuttings.

Genus **MELOCANNA** Trinius

The rhizome of the genus is sympodial or clump-forming, developing long necks and making the culms appear open and solitary. Culms are erect and internodes are long, the nodes are not very prominent with many branches (cluster of slender sub-equal branches). The primary branch is slightly bigger than the other branches. Culm sheaths are often persistent, thick, hard and brittle; the auricle is inconspicuous; ligules are low, rim-like and toothed. It is a monotypic genus native to East Bengal Region of India and Myanmar. It is frequently introduced in gardens in the tropics.

A sympodial or clump-forming bamboo with slender and elongated neck. The culms are more open or far apart, straight, 1.73-20m high and 5-4cm in diameter. Internodes are green with a thin white-waxy covering becoming yellow-brown and glabrous with age. Culm sheaths are persistent covered with deciduous appressed silvery and brown bristly hairs. There are 4-10 branches per node starting at the midculm, clustered and equal in thickness. Leaves are 6-12 per branch and glabrous on both surfaces .....*Melocanna baccifera*

Scientific name: ***Melocanna baccifera*** **(Roxb.)Kurz**

Common/Vernacular names: Muli or Berry bamboo (English); Tarai or Wati (India); Muli (Bangladesh); Tabinwa (Myanmar)

Origin and geographical distribution:

Muli bamboo occurs naturally in Bangladesh, Myanmar and Northeastern India. It is occasionally cultivated and has been introduced and planted in many botanical and private gardens all over the world, especially in Southeast Asia, including Hongkong, Taiwan, and the Philippines.

Brief description:

Muli bamboo is a loose, clump-forming bamboo with a height of 1.73-20m and a diameter of 1.5-4cm. The internode is green, 28.5-40cm, with a thin white wax covering becoming yellow and glabrous when old. Culm sheath is light green with appressed silvery and brown bristly hairs. Branches (4-10) are 45-62cm long. Leaves (6-12) are lanceolate, 7.2-30cm long and 1.8-3.9cm wide. Auricle is not prominent but substituted by plenty of golden, wavy or curled bristles 1-1.5cm long.

Uses:

In the native area of *M. baccifera*, especially in Bangladesh, it is one of the most useful bamboos. The culms of muli bamboo are widely used in building houses, for woven wares (baskets, mats, handicrafts, etc.) and as important source of superior paper pulp. The shoots are edible and constitute one of the important foods of the tribal people of Chittagong.

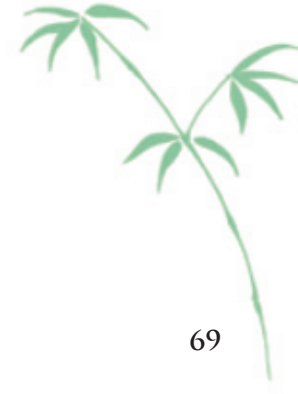
Propagation methods:

M. baccifera can be propagated by seed, single-clump division, rhizome and culm cuttings. When seeds are available, they are the best means of propagation for *M. baccifera*. However, these should be collected from the youngest culms, while the lateral buds are still dormant or before they have pushed more than 5-7.5cm.

Genus **NASTUS** Nees

The genus Nastus is found mainly in the southern hemisphere from Madagascar to Solomon Islands. In Malesia, there are about 11 species, each of them having a very limited distribution and found only in the montane vegetations. The only species found in Java is *Nastus elegantissimus* which is used as poles for drying tobacco leaves. In the Philippines, only *N. elatus* was introduced and planted at the bambusetum in the DENR-ERDS CAR in Loakan, Baguio City.

Loose, clump-forming species, basal portion of young culms with many purplish to brownish stripes; culm sheath and sheath blade is light green; branches are 30-50, unequal in sizes, mostly small and short; leaves are linear, the upper surface is glabrous while the lower is hairy .....*Nastus elatus*



Scientific name: ***Nastus elatus*** **Holttum.**

Common/Vernacular name: Mingal/Mengagi (Papua New Guinea)

Origin and geographical distribution:

This species grows wild in the highlands of Papua New Guinea. It has also been introduced in the lowlands of Queensland, Australia and in Baguio City, Philippines.

Brief description:

It is a loose, clump–forming bamboo species, culms green to purplish to brownish especially the mature ones. It reaches a height of 11–14m and 4.8–8.5cm in diameter. Internode is 2.5–3.6cm long and has 0.4-1cm wall thickness. Culm sheaths are yellow green, 32-34cm long, 25–32cm wide and glabrous; the auricle is not prominent; sheath blade is yellow green, reflexed and glabrous. Nodes have whitish wax below, sheath scar and nodal ridge are present. There are about 30-50 branches, of which five are usually big and the rest are small, 10–190cm long and 0.5-3cm in diameter. Leaves (5–12) are linear, 12–22cm long and 0.5–1.5cm wide; the petiole is 5mm long with the upper surface glabrous and the lower surface hairy; leaf sheath is light green, hairy, 3.5-6cm long and 0.5–1cm wide; and the auricle is yellowish and glabrous.

Uses:

Culms are used for building houses and musical instruments. Shoots are edible, often eaten raw.

Propagation method:

N. elatus can be propagated using offset cuttings.

Genus **OTATEA**

The *Otatea* is a smaller genus of clumping bamboo originating from parts of South America. They are one of the more priced ornamental bamboos found in the US. They are grown for their airy appearance and graceful movement.

Culms are yellow green; culm sheath is pinkish; sheath is light green and erect; there are 1-2 branches at the lower portion almost attached to the culm; leaves are linear and glabrous; there is no petiole; and the leaf sheath is mint green .....*Otatea acuminata ssp. aztecorum*



Scientific name: ***Otatea acuminata ssp. aztecorum***

Common/Vernacular name: Weeping bamboo (English)

Origin and geographical distribution:

Weeping bamboo is indigenous to Mexico. It was also seen flowering in Sacramento, California in 2002. Since then, it has been introduced in different parts of the world. In the Philippines, it has been planted as an ornamental in private individual/bamboo enthusiasts' gardens in Cagayan de Oro, Misamis Oriental in Mindanao.

Brief description:

It is a sub-tropical clumping bamboo with densely tufted culms reaching a height of 1.5-2m and a diameter of 0.27-0.49cm. The internode is yellow green and 9-11cm long. Culm sheaths are pinkish, linear, 7-10cm long, 1-2cm wide and glabrous; sheath blade is light green, erect, 3.5-15cm long and 0.5-0.7cm wide. The node is reddish with sheath scars and nodal ridge present. Branches (1-2) are 40-70cm long, 0.05-0.10cm in diameter, erect and almost attached to the culm. Leaves (4-8) are linear, 2.5-10.5cm long, 0.1-0.5cm wide and glabrous; petiole absent; leaf sheath is mint green, 1.5-4cm long, 0.2-0.5cm wide with two 1.5cm long white bristles.

Uses:

Weeping bamboo is known for its airy appearance, graceful movement and durability. It is commonly planted as an ornamental, hedge and as interior plantings.

Propagation method:

It can be propagated using clump division.

Genus **PHYLLOSTACHYS** Siebold & Zuccarini

Phyllostachys is a genus native to China and Japan. It grows well in cool climates. The rhizomes of the species under this genus are monopodial or running. Culms are erect, widely spread, arising laterally from the slender, cylindrical, typically hollow rhizomes. Internodes are flattened or grooved at one side in line with the branch complement. There are usually two branches of unequal size. Culm sheath is papery to subcoriaceous and spotted outside.

Culm internodes are covered with velvety white hairs when young .....*Phyllostachys pubescens*

Culm internodes are different from the one described above. Culms are yellow with or without green striations on the hollow portion; the auricle has dark brown to purplish bristles.

Culm internodes are dark green to purplish, glabrous and do not have velvety hairs .....*Phyllostachys nigra*

Culms are yellow with or without green striations; the auricle has purplish to dark brown bristles

Culms are yellow with green striations; the auricle has purplish bristles ...*Phyllostachys aureosulcata f. spectabilis*

Culms are yellow without green striations; the auricle has dark brown bristles .....*Phyllostachys vivax f. aureocalis*

Culms are green; culm sheath is yellow green or yellowish with or without dark brown spots or covered with white hairs; the auricle has dark brown to purplish bristles

Culms are green; culm sheath is yellow green; sheath blade is erect or reflexed, glabrous or covered with white hairs

Culms are green; culm sheath is yellow green; sheath blade is erect and glabrous .....*Phyllostachys praecox*

Culm is green; culm sheath is yellow green covered with white hairs; sheath blade is reflexed and glabrous .....*Phyllostachys aurea*

Culms are green; culm sheath is yellowish to brownish with dark brown spots; and the auricle has dark brown to purplish bristles

Culms are green; culm sheath is yellowish with dark brown spots; the auricle has dark brown bristles .....*Phyllostachys bambusoides*

Culms are green; culm sheath is brownish with dark brown spots; the auricle has purplish bristles .....*Phyllostachys dulcis*



Scientific name: ***Phyllostachys aurea*** **Carr. ex A. & C. Riviere**

Common/Vernacular names: Fishpole bamboo, Hotei-chiku (English); Pring uncue (Indonesia)

Origin and geographical distribution:

Phyllostachys aurea is believed to originate from temperate and subtropical Southern China and Japan. It has been introduced into most countries of the world and is often grown as an ornamental.

Brief description:

It is an open and running bamboo (monopodial). The culms are erect, 2.51-12m tall, 1.1-9cm in diameter, 0.2-0.8cm wall thickness, green when young and golden yellow when older. Internodes are 10-20cm long with white powdery wax below the nodes, and the lower ones are often irregularly short and swollen. Nodes are prominent, lower ones are close together and oblique while the upper ones are distant and horizontal. Young sheath scars are fringed with short white hairs. Branches are usually paired in the midculm part, unequal in thickness, 39-125cm long and 0.3-0.4cm in diameter. Leaves (4-10) are green, lanceolate, 3.5-15cm long and 1.1-1.6cm wide with petiole 4-5mm long. Leaf sheath is green, minutely soft-hairy when young, 3.5-4.5cm long, 0.5-0.6cm wide and has 0.2-0.6cm yellowish bristles.

Uses:

P. aurea is a popular garden ornamental and hedge. Its basal culm parts are irregular, short and swollen, hence, they are sold as walking sticks, umbrella and fan handles and as material for souvenirs.

The straight upper part of the culm are used as fishing rods, ski poles, javelins, and for furniture and construction.

Propagation methods:

P. aurea can be propagated by seed and by rhizome cutting. Since the seed is rarely available, the common propagation method is by rhizome cutting. Clump parts, 0.5-1.0m long, are taken having a rhizome, roots, and 1-several culms. They can be planted in previously prepared holes, enriched with organic manure. They can also be potted in black plastic bags or in pots using garden soil with organic manure.

Scientific name: ***Phyllostachys aureosulcata f. spectabilis***

Common/Vernacular names: Yellow grove bamboo (China);
Crookstem bamboo (English)

Origin and geographical distribution:

This bamboo was found planted and flowering in the USA in 2005. This was introduced to the Philippines in 2008 and is being propagated at the Benguet State University and distributed within its vicinities.

Brief description:

This bamboo is a monopodial or running type of bamboo reaching a height of 1.9-3.3m, a diameter of 0.9-1cm and wall thickness of 0.1-0.2cm. Internode is color yellow, 75-95cm long, hollow or sulcate in the branch-bearing side of the culm. New culms turn burgundy-red when exposed to the sun. Culm sheaths are yellow green, linear, 3.8-4.5cm long, 0.4-0.8cm wide and glabrous; the auricle has five 3mm yellowish bristles on both sides; sheath blade is green, linear and glabrous. Nodes are green with scar and nodal ridge. The two branches are 48-58cm long, 0.2-0.3cm in diameter and erect. Leaves (1-2) are very thick, lanceolate, 8-11cm long, 1.5-2.3cm wide, upper and lower surfaces are glabrous; leaf sheath is green, 2.7-3.4cm long, 0.1-0.2cm wide, with six 5mm long purplish bristles.

Uses:

Excellent for containers or used as a screen. It can also be planted as an ornamental.

Propagation method:

This bamboo can be propagated using rhizome cutting.

Scientific name: ***Phyllostachys bambusoides*** **Sieb. & Zucc.**

Common/Vernacular names: Timber bamboo (English);
Ma-dake (Japan)

Origin and geographical distribution:

Phyllostachys bambusoides is native to Central and Eastern China, especially along the Yangtze region. It was introduced in different parts of the Philippines especially in Baguio City and vicinities where this bamboo was planted for experimental purposes.

Brief description:

This bamboo has a monopodial type of rhizome system, wherein new shoots grow far apart from each other. Culms reach a height of 2.4-3.9m, a diameter range of 1.3-1.8cm and a wall thickness of 0.3-0.8cm. However, in its native habitat, it can reach a height of 18-20m and a diameter of 10cm. Internodes are green, 83-101cm long, with spots when mature, glabrous and grooved on the branch-bearing side. The node has two branches, 75-79cm long and 0.4-0.5cm in diameter. Leaves (2-5) are lanceolate, 3.5-15cm long, 1-2.5cm wide, and has 0.5cm long petiole, and the upper and lower surfaces are glabrous. Culm sheath is 8.5-13.5cm long, 5.7-6.5cm wide, flesh with spots, and the lower portion is densely covered with brown hairs.

Uses:

Rhizomes are used in treating painful joints and cough with panting. Culm leaves are used for muscular eruption. Splits are excellent materials for weaving handicrafts. Shoots can be eaten after boiling in water.

Propagation method:

P. bambusoides can be propagated using rhizome cutting.

Scientific name: ***Phyllostachys dulcis*** **McClure**

Common/Vernacular name: Sweetshoot bamboo (English)

Origin and geographical distribution:

Sweetshoot bamboo is planted in China and California, USA for its delicious shoots. Its shoot is one of the finest for the culinary enthusiasts. It was introduced to the Philippines from China in 2008 and is now being cultivated in different areas of Benguet and vicinities through the Benguet State University in La Trinidad, Benguet. It was introduced to Laguna in 2011.

Brief description:

It is monopodial or running bamboo reaching a height of 9.68-16.66m and a diameter of 7.5-8cm. Internodes are emerald-green in color and 6.6-8.5cm long. Culm sheath is purple inside, brown with dark brown spots outside while the lower portion is flesh, 7.3-13.4cm long and 6.2-6.5cm wide; sheath blade is erect, 1-1.5cm long, 0.4-0.5cm wide, curly with yellowish stripes; and auricle has dark brown curly bristles. The node is green with sheath scars and nodal ridge. Leaves (2-3) are lanceolate, 6.5-13.5cm long and 1.3-1.5cm wide; the petiole is 0.4-0.5cm long; leaf sheath is yellowish, glabrous, 3.0-3.7cm long and 0.2-0.3cm wide; and the auricle has 4mm purplish bristles.

Uses:

Sweetshoot bamboo is being used as screen or hedge, for riverbank stabilization, erosion control and shoot production.

Propagation methods:

This bamboo can be propagated by seeds and through rhizome cuttings.

Scientific name: ***Phyllostachys nigra*** **(Lodd.) Munro.**

Common/Vernacular names: Black bamboo (English);
Kuro-chiku (Japan)

Origin and geographical distribution:

Phyllostachys nigra is native to China and Japan and is now widely distributed. It was introduced in the Philippines for experimental purposes and as ornamental.

This bamboo grows well at high altitudes or in areas with cool climate.

Brief description:

This bamboo has a monopodial rhizome system. The new shoots grow far apart from each other. Culms are green at first, then gradually become brownish to black. Culms reach a height of 1.9-2.5m and a diameter of 1-1.6cm and a wall thickness of 0.21-0.50cm. However, in its native habitat, it can reach a height of 2-7m. Nodes are prominent with supranodal ridge. Internode is 50-75cm long and grooved on the branch-bearing side. There are two branches, 41-47cm long and 0.10-0.20cm in diameter. Leaves (2-4) are lanceolate, 5.4-9cm long, 1-1.4cm wide, and has 3-4.4mm long petiole; leaf sheath is yellow green, glabrous, 2.4-6cm long, and 1-3cm wide. Culm sheath is 2-6cm long and 0.2-0.4cm wide; auricle and ligule are inconspicuous; and the sheath blade is narrowly lanceolate.

Uses:

Culms are used in making furnitures, musical instruments and handicrafts in countries where it is abundant. In England, pipe stems, chairs, and walking sticks are usually made out of this bamboo. In the Philippines, it is usually planted as an ornamental.

Propagation method:

This bamboo is propagated using rhizome cutting.

Scientific name: ***Phyllostachys praecox*** **C. D. Chu et C. S. Chao**

Common/Vernacular name: Praecox bamboo (English)

Origin and geographical distribution:

This bamboo came from China. It was introduced to the Philippines in 2008 and was propagated and planted at the Benguet State University in La Trinidad, Benguet. It was later distributed to different parts of Benguet and in other parts of the country.

Brief description:

It is an erect, monopodial or running bamboo reaching a height of 1.8–4.8m and a diameter of 1.4–2.8cm and wall thickness of 0.3–0.7cm. Internode is green and 5.5–9.4cm long. Culm sheaths are light green, linear and glabrous, 5.5–7.5cm long and 0.5–1cm wide.The auricle has 2–3mm purplish bristles. The ligule is light brown, about 1mm long. Sheath blade is 0.3–0.5cm, light green, erect and glabrous. Nodes are green with nodal ridge. The two branches are 47–49cm long and 36–39cm in diameter. Leaves (2–5) are lanceolate, 5.5–6cm long and 1.5–1.8cm wide with the upper and lower surfaces glabrous. Leaf sheaths are yellow green, glabrous, 4cm long, 0.3–0.4cm wide with dark brown hairs.

Use:

This bamboo can be raised for ornamental purposes.

Propagation method:

This bamboo can be propagated using rhizome cuttings.

Scientific name: ***Phyllostachys pubescens*** **Mazel ex. H de Leh**

Common/Vernacular names: Edible bamboo (English);
Moso (Japan)

Origin and geographical distribution:

Phyllostachys pubescens is distributed in the warm-temperate parts of China. It is also introduced in different parts of the Philippines especially in Baguio City and vicinities where the climate is cold to ensure its growth.

Brief description:

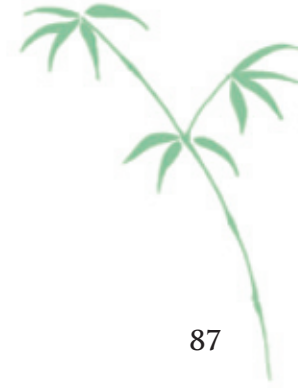
Culms of *P. pubescens* are widely spaced. They have monopodial or running rhizomes. Culms are erect, 6-20m tall, 2-5cm in diameter, has 0.7-1.1cm wall-thickness, velvety pubescent when young, then become smooth, yellowish green to pale green when old. Nodes are prominent and the glaucous ring below the nodes are very evident. Culm sheaths are purplish brown when young, densely covered with dark brown hairs particularly at the upper and lower portions, often with dark brown spots outside; sheath blade is narrowly triangular and erect. Branches are usually two at each node, sometimes three, 4.5-38cm long and 0.33-0.44cm in diameter. Leaves are 2-5 per branch, linear-lanceolate, 3.5-10cm long, 0.6-1.5cm wide, glabrous on the upper surface and pubescent underneath; leaf sheath is yellow green, glabrous, 2-4cm long and 0.5-0.7cm wide.

Uses:

P. pubescens is a major commercial species in China and Japan. It is used in building materials, making agricultural and household implements and for shoot production.

Propagation methods:

P. pubescens can be propagated using seeds and rhizome cuttings.



Scientific name: ***Phyllostachys vivax f. aureocalis*** **N. X. Ma**

Common/Vernacular name: Green stripe vivax (China)

Origin and geographical distribution:

Green stripe vivax can be found in China and the United States of America especially in California where it was found flowering in 1974. It was introduced to the Philippines from China in 2008 and was planted and propagated at the Benguet State University in La Trinidad, Benguet. It was distributed and planted within the vicinities of Benguet and also in some parts of Laguna.

Brief description:

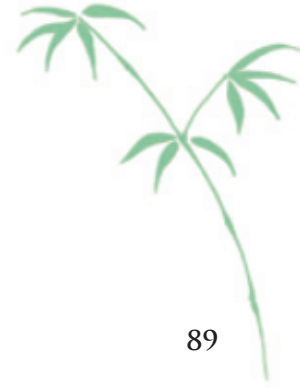
Green stripe vivax is a monopodial or running bamboo with pure-yellow cane and random green stripes. It reaches a height of 1.6-2.2m and a diameter of 0.8-1cm. The internode is bright yellow, 70-75cm long and has a wall 0.1-0.3cm thick. Culm sheath is purplish, 3cm long, 1.1cm wide and glabrous; the auricle is not prominent; and the sheath blade is very small, yellow green and erect. Node is yellow with the sheath scar and nodal ridge present. Branches (1-2) are 11-41.5cm long and 0.1-0.4cm in diameter. Leaves (2-3) are lanceolate, 11-12.5cm long, 1.5-1.6m wide and glabrous; leaf sheath is yellow green, glabrous, 2.5-3.6cm long and 0.2-0.3cm wide; and the auricle has brown hairs.

Uses:

It is used as screen, hedge and ornamental, for riverbank stabilization, erosion control and shoot production.

Propagation method:

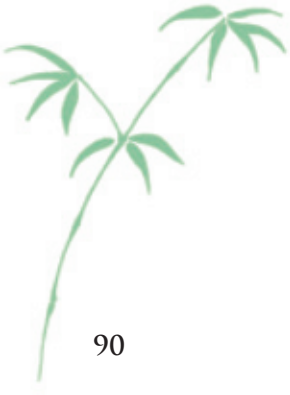
It can be propagated using seeds and rhizome cuttings.



Genus **PSEUDOSASA** Makino

The genus *Pseudosasa* has a monopodial type of rhizome. They are found spontaneously growing on remote islands of the South of Japan and China. One branch can be found on one node on the upper part of the culm. The node is not prominent. The culm sheaths are persistent and longer than the internodes.

Culms are covered with brown bristly hairs when young and become smooth with age with white wax below the nodes. Branch in the midculm appears in threes. The primary one is slightly thicker and appressed to the culm at the base. Culm sheath has dark brown bristles at the margin. The leaves are linear lanceolate. Auricle is purplish with long, whitish bristles .....*Pseudosasa japonica*



Scientific name: ***Pseudosasa japonica*** **(Sieb. & Zucc) Makino ex Nakai**

Common/Vernacular name: Arrow bamboo (English)

Origin and geographical distribution:

This species is a native of Japan and Guangdong Province in China. *Pseudosasa japonica* has been cultivated in Asia and Europe for its effectiveness as a windbreak and screen.

Brief description:

The culms are spreading far from each other because they have monopodial rhizomes. The culms are 5-10m high and 2-6cm in diameter. Internodes are 25-30cm long, 0.11-0.22cm wall thickness, covered with brown bristly hairs when young then become smooth with age, and has white wax below the nodes. Branches (4-9) in the midculm appear in threes, the primary one being slightly thicker and appressed to the culms at the base. Culm sheaths are olive green, 13-18.5cm long, 3-6cm wide, with 1m dark brown bristles at the margins; sheath blade is 2.5-7cm long and 0.20-0.70cm wide. Leaves (4-6) are linear-lanceolate, 3.5-23cm long, 0.5-3cm wide, upper and lower surfaces are glabrous; leaf sheath is yellow green, 2-9cm long, 0.3-0.4cm wide; and the auricle is purplish with 6cm long whitish bristles.

Uses:

It makes an excellent interiorscape plant due to its ability to withstand drier conditions and low light levels. It can also be used as an effective barrier in coastal conditions. It is also being planted as a windbreak and screen as well as a favorite for gardens and landscaping.

Propagation method:

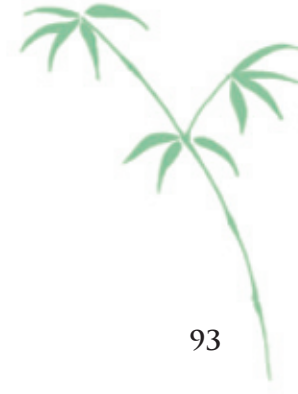
P. japonica can be propagated by rhizome cuttings.

Genus **SASA** Makino & Shibata

The rhizome of the species under the genus is sympodial or clump-forming. The culms are erect, dwarf but those on the valleys are taller, 20cm to 4m high; and its leaf has cross veins. Culm sheath is persistent. Auricles and ligules are conspicuous and well-developed. It is widely distributed on the main island of the Japanese archipelago.

Culm branches and culm sheath are yellow green to yellowish in color. Leaves are small, milky white in color especially when starting to open due to long and short white striations .....*Sasa kurilensis f. Kikan-shiroakebono*

Culms, branches and culm sheaths are green in color with whitish striation. Leaves are big, green with wider whitish striations. The yellow green background in the leaves turns into white .....*Sasa kurilensis f. Takara*



Scientific name: ***Sasa kurilensis f. Kikan-shiroakebono*** **Muroi et. Yuk. Tanaka**

Common/Vernacular names: Kikan-Shiro-Akebono (Japan); Japanese variegated bamboo (Philippines)

Origin and geographical distribution:

The species is one of the most frequently found type in Mt. Hyonosen in Hyogo Prefecture in Japan. It was introduced in the Philippines in 2008 and is now found for sale in gardens in different parts of the country and planted in gardens of private individuals/ bamboo enthusiasts.

Brief description:

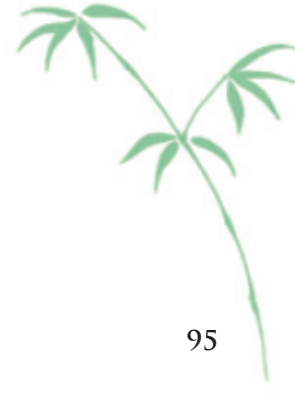
This is a loosely tufted bamboo species with yellow green culms reaching a height of 1-5m and 1.3-3.8cm in diameter. Culm sheaths are yellow green, glabrous, 7-9.5cm long and 1.8-7.7cm wide; sheath blade is yellow green, erect, narrowly triangular and glabrous. Node is green with whitish powder. Branches (3-5) are 15-75cm long and 0.02-0.45cm in diameter. Leaves (4-15) are lanceolate, 4.5-10cm long, 0.8-1.5cm wide, and has a 1-2mm petiole with the upper and lower surface glabrous; leaf sheath is yellow green, 2-4.5cm long, 0.4-0.8cm wide; auricle is lobed, 1mm long, with 3mm yellowish bristles.

Use:

It is a very expensive and beautiful bamboo used as an ornamental.

Propagation methods:

This bamboo can be propagated using clump division or offset method.



Scientific name: ***Sasa kurilensis f. Takara*** **H. Okamura et Yuk Tanaka**

Common/Vernacular names: Australian bamboo (Philippines); Takara – Nemagari (Japan)

Origin and geographical distribution:

This bamboo is commonly found in Mt. Hyonosen in Hyogo Prefecture in Japan. It was introduced in 2008 in the Philippines and is now sold in different commercial gardens and found in gardens of private individuals or bamboo enthusiasts in different parts of the country.

Brief description:

This bamboo is a loose, sympodial bamboo with olive green culms reaching a height of 2.5-3.5m and 0.93-3.24cm in diameter. Culm sheaths are yellow green with about 1cm whitish striations on both margins, 5.5-10.5cm long and has white stiff hairs on the outer portion; sheath blades are 4.5-12cm long and 1.5-2cm wide, reflexed, yellow green with whitish striations.

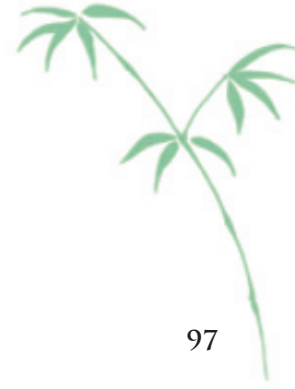
Branches (5-10) are 13-45cm long and 0.27-0.5cm in diameter. Leaves (3-12) are lanceolate, 12-27cm long and 2.5-4cm wide; has 1-2mm long petiole, upper surface is glabrous while the lower surface is pubescent; leaf sheath is yellow green with stiff yellowish hairs, 1.5-7cm long and 0.7-0.9cm wide; the auricle is lobed with few 3-4mm yellowish bristles.

Use:

The leaves, stems, poles and culm sheath of this bamboo have striations, hence, it looks beautiful and planted as ornamental.

Propagation methods:

This bamboo can be propagated by seeds or offset cuttings.



Genus **SCHIZOSTACHYUM** Nees

The rhizome of the species under this genus is sympodial or clump-forming. The culms are erect. Internodes have pale appressed hairs all over and a white-waxy zone just below the node. Culm sheaths have blades that are either erect, spreading or reflexed. Auricles are lobe to rim-like with bristles on the margin. There is a branch complement at the middle part of the culm with a cluster of slender, sub-equal branches. There are about 45-50 species under this genus. It came from South China through Southeast Asia to the Pacific islands.

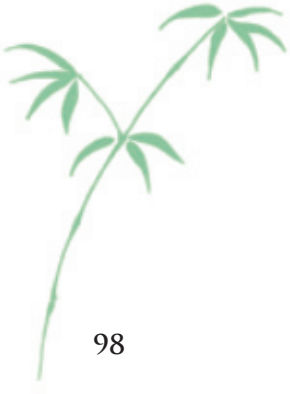
Culm sheath blades are erect at first then reflexed, linear lanceolate

Culm diameter is 2-4cm, the wall is more or less 2mm thick
.....*Schizostachyum lima*

Culm diameter is 4-8cm, the culm wall is 4-10mm thick
.....*Schizostachyum lumampao*

Culm sheath blades are stiffly erect, tardily reflexed, narrow

Culm internodes are yellow orange with green striations
.....*Schizostachyum brachycladum* (yellow form)




Scientific name: ***Schizostachyum brachycladum*** **Kurz**

Common/Vernacular names: Buhong dilaw (Philippines); Phai por (Thailand); Buluh lemang (Indonesia); Buloh lemang (Malaysia)

Origin and geographical distribution:

Schizostachyum brachycladum is widespread in South-east Asia (i.e., Thailand, Peninsular Malaysia, Sumatra, Java, Borneo, Sulawesi, the Moluccas, Bali, and in the Philippines) as an ornamental.

Brief description:

S. brachycladum is a densely tufted, clump-forming bamboo with erect culms and pendulous tip. Culms reach a height of 7-15m, 7-10cm in diameter and wall thickness of 3-5mm. It is often golden yellow with narrow green striations. The nodes are not swollen and do not have aerial roots.

Culm sheath is yellow with few green stripes and appressed dark brown hairs, 12-27cm in height and 18-35cm in width. The outer portion is covered with light brown to brown hairs. The nodes are not swollen with whitish powder below the nodes but no aerial roots. There are 10-20 branches which are 15-25cm in length and 0.34-0.64cm in width. Leaves (3-9) are lanceolate, 26-32cm long and 3.5-6cm wide, dark green with two white lines. Leaf sheaths have stiff golden hairs; the auricle is very small with purplish bristles; and the ligule is short, about 1mm, entire.

Use:

S. brachycladum is often cultivated for ornamental purposes.

Propagation methods:

S. brachycladum can be propagated using rhizome and culm cuttings. Rhizome cuttings, consisting of a rhizome part, roots and a culm part, are most commonly used in propagating this bamboo.

Scientific name: ***Schizostachyum lima*** **(Blanco) Merlll**

Common/Vernacular names: Buluh toi (Indonesia); Sumbiling (Malaysia); Bagakai, Anos, Sumbiling (Philippines)

Origin and geographical distribution:

Schizostachyum lima is native to the Philippines, Borneo, Sulawesi, the Moluccas, New Guinea and the Solomon islands.

Brief description:

It is a densely tufted, clump-forming bamboo. The culms of *S. lima* are erect with drooping tips, 7-13m tall, 2-4cm in diameter, 2mm wall thickness, rough and hairy when young but becomes glabrous at maturity. The internodes are green and 30-100cm long. Culm sheath is green, 18-30cm long and 8cm in diameter. The auricle is not prominent and bears curved bristles up to 2mm long. Nodes are not prominent and the sheath scars are still attached. Branches several to numerous at the upper nodes, 21-90cm long and 0.11-0.34cm in diameter. Leaves (4-9) are linear-lanceolate, 30-36cm long, 2.5-3.8cm wide, with yellow-green leaf sheath which is glabrous and does not have a distinct auricle.

Uses:

In the Philippines, the culms are very useful. The rough culms are used for smoothing bronze. The culms are also used to make sawali or bamboo matting and other woven wares, as fishing rods and in making musical instruments.

Propagation methods:

S. lima is propagated by seedlings collected from natural stands and by offset cuttings.

Scientific name: ***Schizostachyum lumampao* (Blanco) Merrill**

Common/Vernacular name: Buho (Philippines)

Origin and geographical distribution:

Schizostachyum lumampao is native to the Philippines and occurs extensively in the provinces of Pangasinan, La Union, Ilocos Norte, Ilocos Sur, Leyte and on the islands of Panay and Basilan.

Brief description:

S. lumampao is a densely tufted, clump-forming bamboo. Culms are erect, glabrous, green, 10-15m tall, 4-8cm in diameter and has walls 4-10mm thick. Nodes are oblique with sheath scars. There are 20-45 branches at the upper nodes.

The culm sheath is 24-26cm long, 30-33cm wide, persistent, and covered with yellowish sharp hairs; the blade is lanceolate, 9-11cm long, 1.9-2.1cm wide, reflexed and shortly pubescent on both surfaces with mostly deciduous hairs; ligule is very short and minutely ciliate; and the auricle is not distinct. Leaves (5-8) are 20-35cm long, 3-4cm wide and linear-lanceolate; sheath is glabrous; the ligule is very short and dentate; and the auricle is not distinct.

Uses:

The culm of *S. lumampao* is widely used in making bamboo matting known as "sawali", a material woven from thin strips, which are commonly used as materials for housing in rural areas.

They are also commonly used to weave baskets, make fences, spears, fishpens, flutes, handicrafts and for many other purposes including construction, plyboo panels and paperpulp.

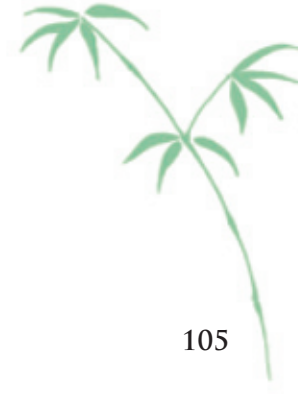
Propagation methods:

S. lumampao can be propagated by seeds, rhizomes, and culm cuttings. However, the seeds are not commonly available. In case they are available, they should be sown immediately in plastic bags in the nursery and transplanted after 5-6 months when seedlings are 30-60cm tall. Rhizome cuttings survive better than culm cuttings. Rhizome cuttings are composed of the part of clump with roots, rhizome part and culm part. Culm cuttings, with 2-node portions, can be taken from 0.5-2-year-old culms, kept in the nursery for 3-5 months and planted out in the field during the rainy season.

Genus **SHIBATAEA** Makino

There are three species known in China and one in Japan. It has the monopodial type of rhizome. The culm reaches 1-2m tall and 5-6mm in diameter in areas with cold climate. However, in most areas in the Philippines, it seldom reaches 1m in height. The branches and twigs are thick and short. The shoots are flat and the culm sheath is thin and deciduous. The leaves which are broadly lanceolate face different directions.

Culms are 0.34-1.5m high and 2-0.5cm in diameter. Nodes are purplish and very prominent. Branches (3-4) are short and smooth. Culm sheath is golden yellow and purplish near the apex. Leaves (1-3) are broadly lanceolate and pubescent beneath .....*Shibataea kumasaca*





Scientific name: ***Shibataea kumasaca*** **(Zoll.) Nakai**

Common/Vernacular names: Japanese bamboo (English);
Okame-zasa, Bungo – zasa (Japan)

Origin and geographical distribution:

It is widely cultivated in Japan and grows naturally in its Southwestern region. It is also extensively planted in Taiwan as an ornamental. In different parts of the Philippines, this bamboo is also cultivated and planted as an ornamental.

Brief description:

Shibataea kumasaca is a monopodial bamboo. It has a spreading habit and is commonly found to be widely spaced. Internodes are 2.6–3.2cm long. The culms are 0.34–1.5m high and 0.2–0.5cm in diameter. Nodes are purplish and very prominent. There are 3-4 branches at each node which are short and smooth. Culm sheath is golden yellow and purplish near the apex, about 4cm long and 1cm wide. Leaves (1–3) are broadly lanceolate and densely pubescent beneath. Margin is scabrous, 6.5–9.5cm long and 1.7–2.5cm wide.

Use:

It is mainly used as an ornamental.

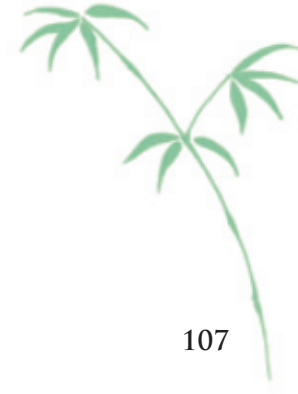
Propagation method:

S. kumasaca is commonly propagated using rhizome division.

Genus **THYRSOSTACHYS** Gamble

The rhizomes of the species under this genus are sympodial or clump-forming. Culms are erect, forming dense tufts and the basal portion is not or slightly branched; internodes are short; nodes are prominent; and the walls are rather thick and solid at the base. There are three to numerous slender branches at the upper nodes. Culm sheaths are pale green when young and turn pale brown with age, persistent, papyraceous, covered with fine, white, short appressed hairs; blades are narrowly triangular and erect; auricles are undeveloped; and the ligules are inconspicuous. Leaf blades are small, narrow and linear-lanceolate. This is a genus of two species native to Myanmar, Thailand and Indo-China. It was introduced to the Philippines and other tropical countries for ornamental purposes.

Culms are erect and densely tufted with arching tips; wall is very thick, solid in the lower part, smooth, greyish green, usually covered with persistent, old culm sheaths; and the leaf blades are narrow ..... *Thyrsostachys siamensis*



Scientific name: ***Thyrsostachys siamensis*** **Gamble**

Common/Vernacular names: Monastery bamboo (English); Bamboo jepang; Bambu siam (Indonesia); Thailand bamboo (Philippines); Tiyowa (Myanmar); Phai-ruak (Thailand)

Origin and geographical distribution:

Thyrsostachys siamensis is native in Myanmar and Thailand where it occurs widely and often abundantly in pure stands. In many other tropical regimes, especially in Southeast Asia, *T. siamensis* has been introduced and widely cultivated as an ornamental and windbreak.

Brief description:

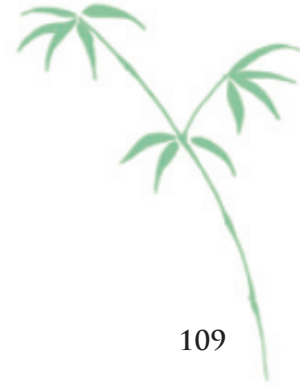
T. siamensis is a densely tufted, clump-forming bamboo species. The culms are erect or have arching tips, 8-14m tall, 2-7.5cm in diameter, solid at the base, grayish green and usually covered with persistent old culm sheaths. Internodes are 15-30cm long bearing a white ring below the shades. Nodes are greenish and not swollen. The sheath scar is prominent but it does not have a nodal ridge and aerial roots. There are many branches with one dominant branch 17-87cm in length and 0.45-0.74cm in diameter. The branches grow upward and without thorns. Leaves (2-8) are green, linear, with a length of 6-15cm, 5-12cm wide and has 1-2mm long petioles. Leaf sheaths are yellow green with white hairs along the edges, 2.5-6cm in length and 2-4cm wide.

Uses:

In its native area, *T. siamensis* is one of the most useful bamboos. The culms are used for house construction, general household uses and as raw material for cottage industry. In Thailand, it also serves as a raw material for paper pulp and as fuel. Young shoots are consumed as vegetable and considered as one of the best bamboo shoots. Because of its elegant habit (compact clumps of outcurving slender culms bearing many small leaves in slender branches), *T. siamensis* is a popular ornamental plant. It is also planted in rows as windbreak.

Propagation methods:

T. siamensis can be propagated by seeds, rhizome cuttings and by tissue culture. Due to its common sporadic flowering, the seeds are always available. Propagation by rhizome cuttings (offsets) is most generally practiced. The rhizome cuttings can be taken from 1-year-old culms with rhizome part and roots, up to 1m long culm part, planted in the nursery for 2-3 months and transferred to the field during the rainy season. In general, ten rhizome cuttings can be taken from a 5 to 6-year-old clump, retaining 4-5 one-year-old culms in the clump (PROSEA 1995).



Fishpole bamboo (*Phyllostachys aurea*)

GLOSSARY OF TERMS

Apex - the tip or highest point of any structure

Appressed - lying flat or pressed closely against another structure

Ascending - growing or moving upward

Auricle - ear-like appendage on the shoulder of the sheath of a culm sheath or leaf sheath

Bristle - coarse, stiff hair or hair-like appendage

Ciliate - bearing fine cilia along the margin

Concave - curved and bulged downward or inward

Culm - jointed stem of grasses and bamboos

Deciduous - falling off

Diffuse - growing in open array, dispersed

Endemic - exclusively native to a specified or comparatively small region

Entire - with a continuous margin, unbroken

Erect - standing upright

GLOSSARY OF TERMS

Ex-situ	- artificial environment or unnatural habitat
Fascicled	- congested in clusters or in bundles
Glabrous	- devoid of hairs
Glaucous	- pale bluish-green or with a whitish bloom which rubs off
Indigenous	- native to a particular area or region
Internode	- section or part between two nodes
Lacerate	- torn; irregularly cleft or cut
Laciniate	- with narrow, parted lobes
Lanceolate	- lance-shaped; much longer than broad; widening above the base and tapering to the apex
Ligule	- thin, apical, extension of the sheath of a culm sheath or leaf sheath
Linear	- long and narrow, the sides parallel or nearly parallel
Malesia	- the biogeographical region including Malaysia, Indonesia, the Philippines, Singapore, Brunei and Papua New Guinea

GLOSSARY OF TERMS

Montane - the biogeographic zone composed of moist, cool slopes below the timberline and having evergreen trees as the dominant life form

Node - point or region of stem from which leaves and branches originate

Pendulous - curved downward, hanging loosely, suspended so as to swing or sway

Persistent - lasting without falling-off

Prominent - expanded and become conspicuous

Propagule - a part of a plant that becomes detached and grows into a new plant

Puberulent - covered with fine hairs

Puberulous - minutely pubescent

Recurved - bent or curved downward or backward

Reflexed - abruptly bent or turned downward or backward

Rhizome - underground stem

Rugose - wrinkled

GLOSSARY OF TERMS

Scabrid/Scabrous	- rough to the touch
Sheath	- lower part of a culm leaf or foliage leaf
Sporadic	- widely dispersed or scattered
Spreading	- standing outward or horizontally
Tomentose	- densely covered with short soft hairs
Truncate	- cut off more or less squarely at the end
Undulate	- wavy
Velvety	- with a covering of dense, fine, soft hairs

REFERENCES

But, Paul Pui-Hay et al. 1985. Hongkong Bamboos. Published by the Urban Council. Hongkong. 85 pp.

Dransfield, S. and E. A. Widjaja. Eds. 1995. Plant Resources of Southeast Asia. No.7. Bamboos. Backhuys Publishers, Leiden. 189 pp.

Espiloy, Z. B. et al. 2007. Abstracts on Philippine Bamboos: FPRDI and ERBI Studies, FPRDI, College, Laguna 4031, Philippines. 76 pp.

Heinriches, J. and K. Flemnons. 2006. Boo-shoot gardens-Discovering Bamboo. 82 pp.

Okamura, H. and Y. Tanaka. 1986. The Horticultural Bamboo Species in Japan. Takanawa Printing Co., Ltd. Japan. 171 pp.

Rao, A. N. and V. Ramanatha Rao, editors. 1999. Bamboo Conservation, Diversity, Ecogeography, Germplasm, Resource Utilization and Taxonomy. Proceedings of a Training Course cum Workshop, 10-17 May 1998. Kunming and Xishuangbanna, Yunnan, China. IPGRI- APO, Serdana, Malaysia. 275 pp.

Rojo, J. et al. 2000. Philippine erect bamboo species: A field identification guide. FPRDI, College, Laguna.

Virtucio, F. D. and C. A. Roxas. 2003. Bamboo Production in the Philippines. Ecosystems Research and Development Bureau, Department of Environment and Natural Resources, College, Laguna

Virtucio, F. D., C. A. Roxas, and C. D. Apolinar. 2007. Monograph on Production and Utilization of Philippine Bamboos. Forest Products Research and Development Institute. DOST, College, Laguna 4031. Philippines. 72 pp.

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